SEPTEMBER | 1958

# products finishing

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Finishes on metal products

# *NEW . . . FROM ROHCO® RESEARCH*

# RO-BRIGHT

*Full-Bright • High-Speed*

## CYANIDE COPPER PLATING PROCESS

✓ **BRIGHTNESS** . . . Extremely wide and usable production bright plating range through current densities up to 80 amps. per square foot.

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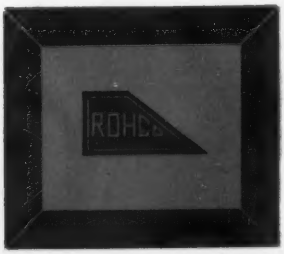
**RO-BRIGHT 1250 — PRIMARY BRIGHTENER**

**RO-BRIGHT 1400 — SECONDARY BRIGHTENER**




*Ask your ROHCO Representative — or write for details. Send sample of your bath for conversion recommendations!*

Nationwide Stockpoints

## R. O. HULL & COMPANY, INC.

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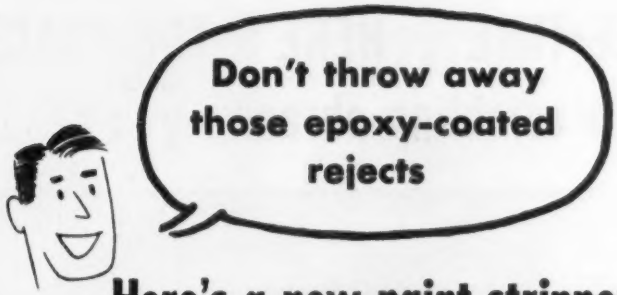


# Here's a new paint stripper that will save them

Do you scrap perfect metal parts that have been imperfectly coated with epoxies, vinyls, polyesters and other hard-to-strip paints or lacquers?

In the last few months, users of Oakite Stripper S-A have eliminated many such losses. Here's what some of them say about it:

**CALIFORNIA:** An aircraft manufacturer tested many strippers on an epoxy designed to resist attack by hydraulic fluid. Finally found that Oakite Stripper S-A is "the only one that safely strips this paint from anodized aluminum."

**NEW YORK:** A camera maker coats flash bulb reflectors with black vinyl paint outside and aluminum paint inside. "Stripper S-A is the fastest ever used on our rejects."

**OHIO:** A maker of toy pistols had trouble stripping alternate coats of lacquer and metallized aluminum. Now "Stripper S-A does it amazingly fast and remetallizing is completely satisfactory."

**CALIFORNIA:** A producer of metal furniture uses Stripper S-A to remove clear epoxy from plated parts. Chemist says "This is the best stripper on the market."

**ALABAMA:** A hardware maker had trouble stripping lacquer from brass door knobs. Oakite Stripper S-A now does the work in "less than ⅓ the time taken by any other stripper."

**NEW YORK:** A manufacturer of business machines tested several strippers on various finishes on steel and aluminum. Verdict in favor of Stripper S-A was: "It's doing a wonderful job."

**FREE** Write Oakite Products, Inc., 20 Rector St., New York 6, N. Y., for complete information on Oakite Stripper S-A.

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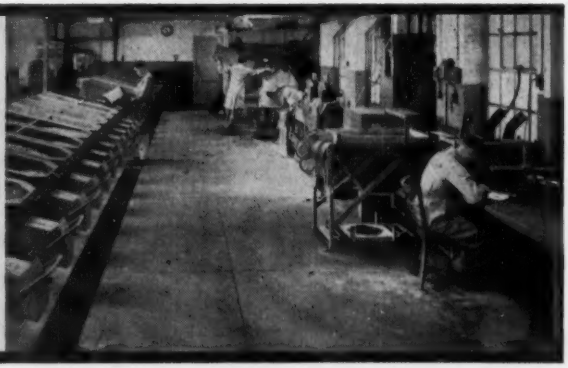

*One leading aircraft parts manufacturing company reports saving over $90,000 yearly by shifting from hand-finishing to barrel finishing with Norton TUMBLEX abrasives.*

There's one sure way for you, too, to get these cost-cutting, product-improving "Touch of Gold" advantages. Your metal parts can range from tiny needles to hefty forgings . . . may be simple or complicated, hard metals or soft . . . may require deburring, descaling, better color and closer finish. Just send sample parts to our Sample Processing Department. They'll be returned to you completely finished to requirements, with a detailed report. Or, next time you're in our area, drop in and learn how your finishing can be improved.

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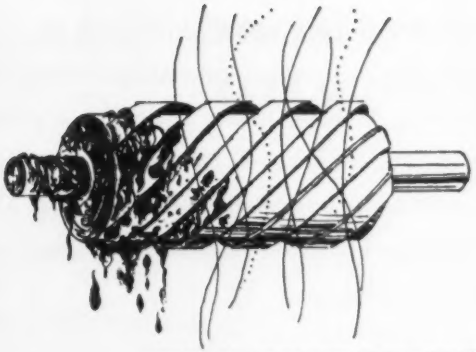

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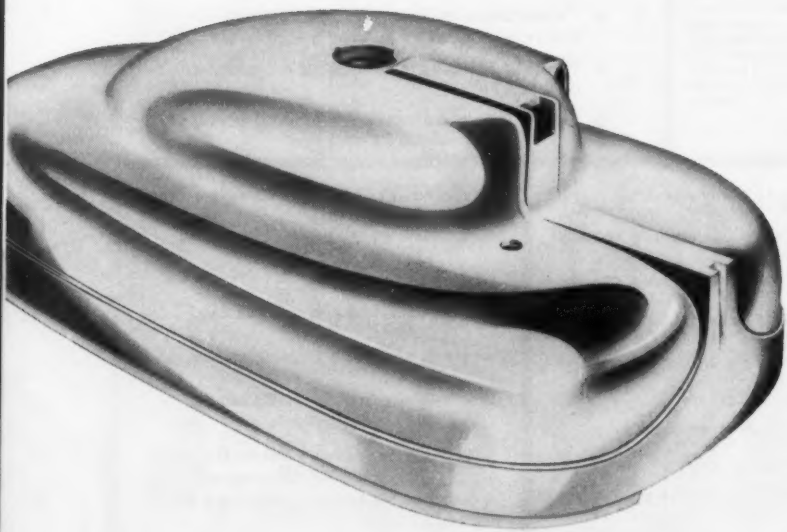

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# products finishing

*Vol. 22 No. 12 September, 1958*

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Model "K" Hammond Automatic Finishing Machines are made in 34", 46" and 62" table sizes. These models are either continuous or for indexing at 150 to 1700 indexes per hour. Head styles include floating, non-floating with 3 H.P. to 20 H.P. range. Also available are attachments for converting heads from buffing to abrasive belt polishing. The Hammond Model "K" will speed up your grinding, polishing, buffing, brushing and de-burring operations. Send us samples and learn how much you can speed them up.

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NEW Rhodium Concentrate

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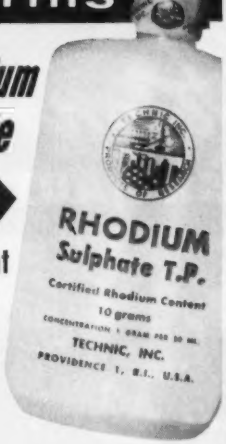


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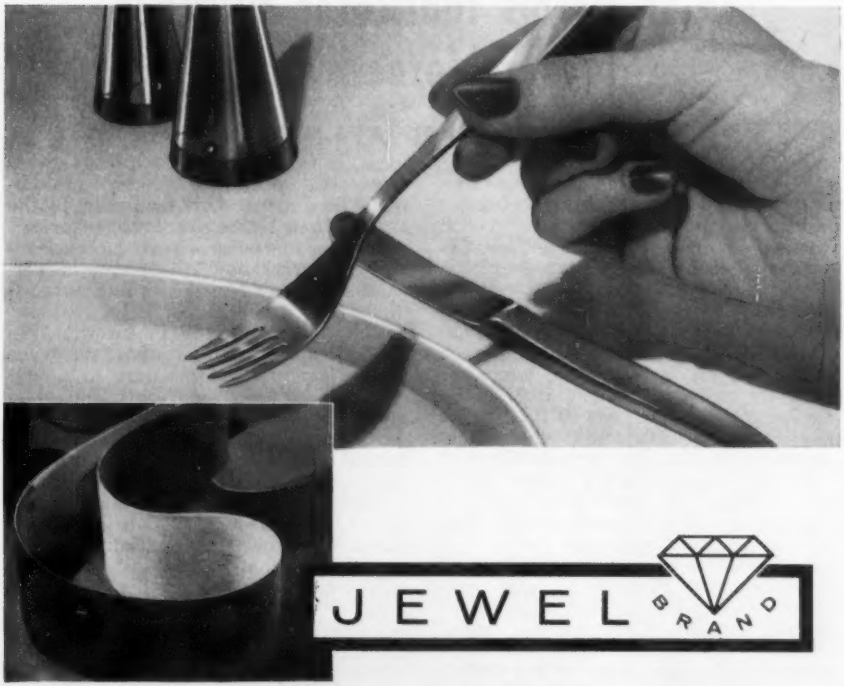

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**Keeping profits on the boil: Can solvents meet the challenge?**

**Today's high standards in mass production metalworking have made metal cleaning a vital arm of production. With final operations demanding more rigid specifications and with final check-out increasingly automated, parts and pieces rejected because of improper cleaning can tie up your metal-cleaning assembly line. When that happens, costs go up, profits down. Are there solvents that can keep pace with today's high-speed, top-quality production? Here's news from Dow of an important trend that can mean better production, and profits, for the industry.**

# Light metals fabricator switches to Perchloroethylene

## . . . cuts rejects, speeds production

A major light metals fabricator recently solved an annoying cleaning problem in its production line . . . it switched to Perchloroethylene for degreasing. Result: cleaner parts first time through, rejects and reruns cut to a minimum.

Their chief engineer says: "We had not thought of Perchloroethylene as a solvent for our cleaning line setup but when we ran into cleaning troubles on the line, our lab ran tests of Per against other chlorinated solvents. We found that particularly in the case of aluminum and other white metals we got better, reject-free cleaning and faster production because of the longer condensation time. Now we've standardized on Per".

***Nationwide switch to Per.*** A high-placed metals-cleaning theorist recently predicted: "The odds are high that a substantial part of production-line metal cleaning will be done with Perchloroethylene in the next three to five years". Nevertheless, right from the start Per has had to combat the false economy story that goes like this: "The additional heat needed for Perchloroethylene makes the degreasing operation costlier than using other standard chlorinated solvents". Actual on-the-job performance tests have shown that, in most instances, any additional heat cost is more than offset by the savings from better cleaning.

***Per wins Fahrenheit war.*** As metal-cleaning engineers know, the secret of Perchloroethylene's higher cleaning power is in its higher boiling point, for example, 250°F. as against 189°F. for trichloroethylene . . . a distinct advantage when removing entrapped moisture in porous metals, deeply recessed parts, and blind holes.

Although honor grades can be assigned tests of various vapor degreasing solvents, Per rates "A" in performance. As a quality performer it offers: higher stability, reduced staining, lower solvents loss, higher solvency power, longer cleaning action, and the elimination of moisture. As an added bonus it comes highly recommended for aluminum cleaning. These customer benefits put Per at the head of the class.

When the vapor trails of competitive solvent claims confuse, most metal engineers consult with a company that makes many different kinds of solvents and can evaluate them all impartially. Dow, for example, will be glad to send a copy of its new 24-page brochure "Modern Vapor Degreasing".

## NEW "TRI" BY DOW

*. . . helps missiles make clean getaway*

Premature explosion of a rocket could be an expensive blast for everyone . . . especially the taxpayer. One of America's leading rocket builders hedged against its big birds going off half-cocked because of dirty missile hardware. A fast consultation with Dow revealed this story . . .

Today's big rockets use liquid fuels that employ an oxidizer (such as liquid oxygen) to burn the fuel. The oxidizer and the fuel are kept in separate tanks and then piped into a combustion chamber where, on contact, they explode and burn. The missile trouble-shooters found that metal-cleaning materials used had left a residue, not inert to the oxidizer. Result: premature explosion. The problem: Find the right cleaning material.

Scientists at the Dow laboratory in Texas immediately began development of a new high purity Trichloroethylene for cleaning missile hardware. They conducted pioneer shock impact tests on many different solvents; and from the data developed, created HI-TRI* (high purity Trichloroethylene) to meet the exacting requirements of the missile makers.

Dow also makes three other types of Trichloroethylene . . . neutral, alkaline, and extraction . . . for all sorts of down-to-earth uses.

Dow makes many chemicals for many jobs in the metalworking industries. If you would like to know more about them, please write THE DOW CHEMICAL COMPANY, Midland, Michigan, Chemicals Sales Department 761G-1.

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**Sodium Orthosilicate**

Recently improved S.O.S. by Dow is "nearly anhydrous". Metal-cleaning formulations with it cut through dirt and grease quicker than ever.

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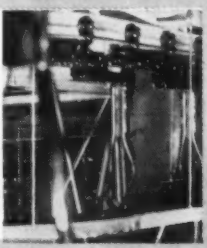
Boil-point low, temperature high. Whenever the alloy is special and the temperature can't be too high, Dow's M.C. is the solvent of choice.



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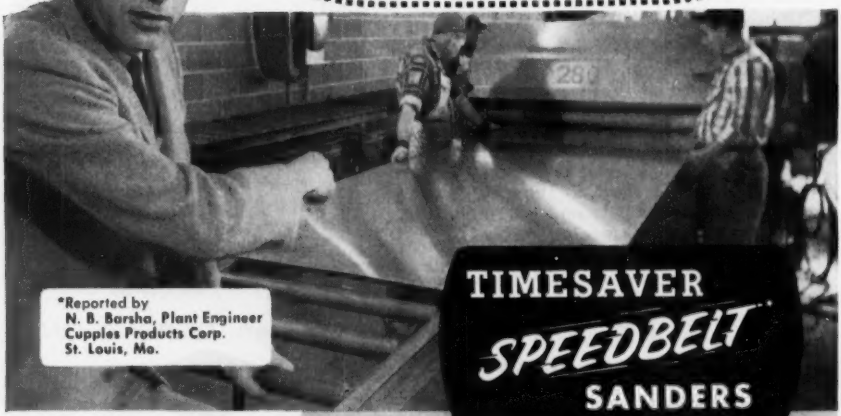
"Only machine capable of handling our rugged and precision sanding requirements on large aluminum panels"*



*Reported by
N. B. Barsha, Plant Engineer
Cupples Products Corp.
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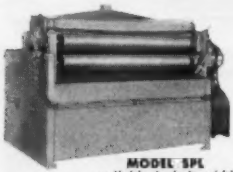
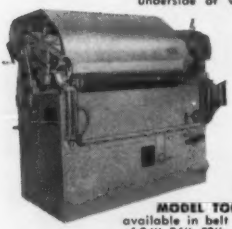


**MODEL SPL**
available in belt widths of 24", 36" and 50"
Sanding action is for underside of work.



**MODEL TOP**
available in belt widths of 24", 36", 50" and 54"
Sanding action is overhead.

*"We were faced with the problem of sanding 1000 vertical aluminum panels, 28'x24"x3/16" for the exterior of the new U.S. Air Force Academy buildings. These panels required finishing to a uniform and precision surface specification. Before we purchased the Timesaver Model TOP-50, we thoroughly investigated the market for sanding machines of this type. The Timesaver "Speedbelt" was the only unit which possessed the durability, accuracy and rugged construction necessary for our requirements."*

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**Investigate** the advantages of Timesaver Sanders for your plant, write for literature and information today.

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**Pioneers in Wide Belt Sanding for the Woodworking Industry**

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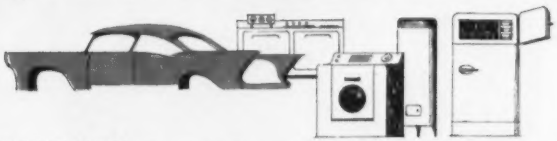
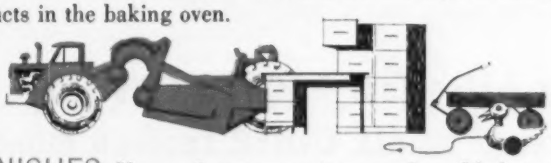
# ISOPHTHALIC RESINS

## offer your products new sales appeal



BAKING FINISHES Isophthalic resins will produce a tougher, harder baking finish that will retain its original gloss. You also get a finish that has greater resistance to alkali, mineral spirits and water. And because of greater thermal stability of Isophthalic resins you can maintain higher-temperature baking schedules—less time needed for products in the baking oven.



INDUSTRIAL FINISHES Years of extra service can be added to metal-surface coatings by employing Isophthalic resins. Better film to metal bonding of Isophthalic resin paints means improved performance—saves time, cuts painting costs. The tougher films have better abrasion resistance, hold up longer under weather conditions, have better gloss retention. Isophthalic resin automotive refinishing enamels have held 85% of their original gloss after 24 months of outdoor weather exposure. There was no evidence of film failure by cracking or checking. They proved far superior to conventional refinishing enamels.

It's worth your time — now to get the full Isophthalic resin story. Write or phone the Oronite office nearest you.

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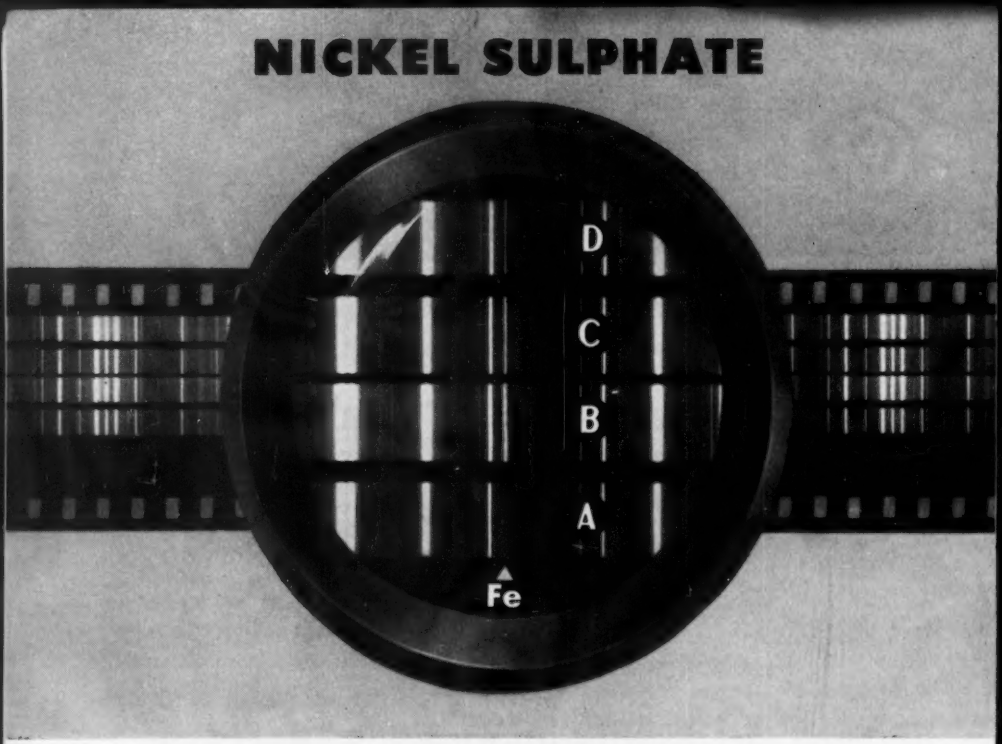


## Test After Test PROVES CP's Nickel Sulphate Purer Than ALL OTHER Leading Manufacturers!

In every important category—purity, ease of use and price—CP's Nickel Sulphate gives you benefits far superior to other brands.

For example: The factual and dramatic photograph above offers proof of the purity of our Nickel Sulphate. We had a series of spectrographic tests made using actual production samples of three leading brands plus our own (A). Not only is there a *difference* in purity, but in two cases it is substantial!

If you have never tried our Nickel Sulphate, why not do so now. It consists of fine, uniform, quick-soluble crystals of 22% nickel; has a special non-caking feature and our prices are equal and, in some cases, lower than other brands. Packaged in 6-ply moisture resistant bags. Send for a free test sample, no obligation of course.

**CP COPPER PIGMENT & CHEMICAL WORKS, INC.**

212 BAYWAY, ELIZABETH 2, NEW JERSEY

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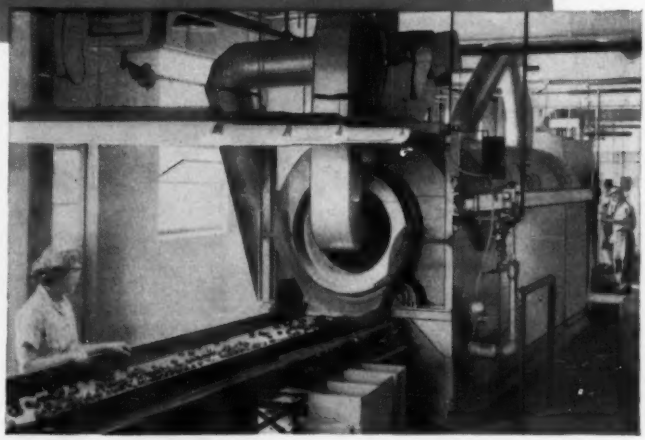
## AGAIN IT TAKES RANSOHOFF TO FILL THE BILL . . .
## AND TWO YEARS OPERATION WITH NO MAINTENANCE

**at Clevite Harris Products, Inc., Cleveland**



Requiring a finished surface chemically clean and free of all foreign material for molded rubber parts, Clevite Harris relied on the proven ingenuity of Ransohoff engineers to meet this rigid requirement. And, living up to their tradition and reputation since 1916, the Ransohoff team again came through with the answer.

This Ransohoff Drum Type unit, at Clevite Harris, for two years — with no maintenance — has been processing 10-12,000 lbs. of molded rubber parts per eight hour period, including up to eight size changes. These parts are subjected to a sequence of a rinse, wash, rinse and dry. Solutions are delivered into the stainless steel drum by dip cups. Patented drum heads retain solutions in each compartment to insure thorough processing of the work.

Operation is completely automatic . . . a bucket conveyor feeds the work into the machine. The first rinse section is arranged to remove fines from the work. At the unloading end, the work is automatically discharged onto a belt conveyor for final inspection and packaging.

This is another typical example of Ransohoff experience meeting a difficult production requirement. What's your problem? A suggested solution from Ransohoff costs nothing, puts you under no obligation. Submit sample parts, if you wish, for test-processing.

**Write today: Ransohoff, Inc., 610 N. Fifth St., Hamilton, Ohio**

**Ransohoff** *The oldest name... the newest ideas*

**Designers and Builders of Equipment for the Surface Treatment of Metals**

• Washing • Rinsing • Burnishing • Rustproofing • Sawdust Polishing and Drying • De-Scaling • De-Burring • Drying • Pickling • Complete Finishing Systems • Foundry Wet Cleaning Mills • Ultrasonic Cleaning

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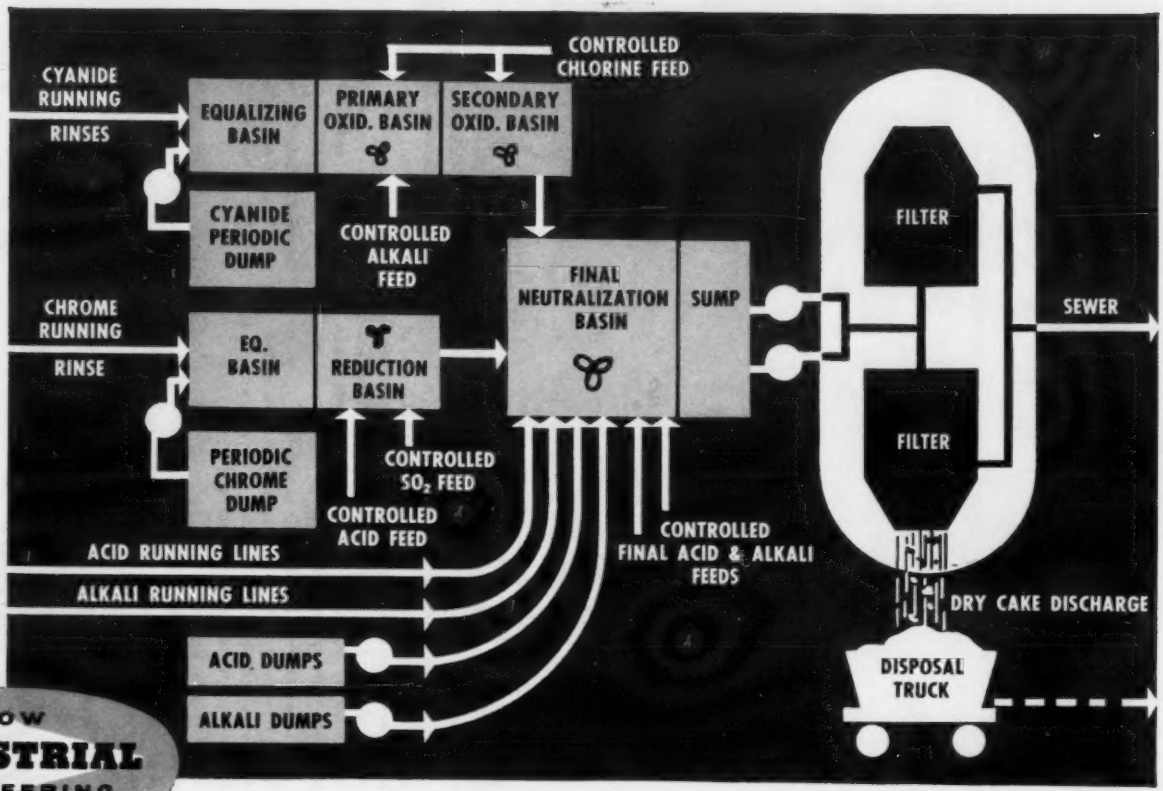


HOW
**INDUSTRIAL**
ENGINEERING
PAYS OFF...

# Cutting Costs on Plating Waste Disposal

**PROBLEM:** Large appliance plant needed an efficient centralized system for disposal of corrosive wastes from several plating lines.

**SOLUTION:** INDUSTRIAL *engineered system* (see diagram) provides a central basin for neutralization of all the acid, alkali, cyanide and chrome wastes delivered from rinsing operations. Only small amounts of chemicals are added to precipitate the dissolved metals for separation by filtration. The two compact INDUSTRIAL filters extract the solids and discharge a neutral non-toxic effluent to the city sewage system.

**RESULTS:** EQUIPMENT COSTS REDUCED BY ONE-HALF—two push-button Vertical Leaf Filters *replace* expensive clarifier mechanisms, sludge pumps and vacuum filter! . . . 90% LESS SPACE required for entire system! . . . SIMPLE INSTALLATION—no excavation or complex concrete work! . . . DRY CAKE WASTE DISPOSAL—discharged by mechanical shakers directly from filters into trucks!

**INDUSTRIAL**

**INDUSTRIAL FILTER & PUMP MFG. COMPANY**
5904 Ogden Avenue, Chicago 50, Illinois

*Call or write INDUSTRIAL to find out how an engineered system like this can solve your specific plating waste problems.*

P-158

PRESSURE FILTERS ◆ ION & HEAT EXCHANGERS ◆ WASTE-TREATING EQUIPMENT

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fostoria INFRA-RED SYSTEM

radiant heating news

*to help manufacturers improve production operations*

# Get these 5 answers before you buy infrared ovens today...

## Q Have you chosen the right type of infrared heat?

Just as gas, electricity and oil offer a choice of fuel in convection ovens, various types of infrared heat sources are available for radiant type ovens. Clear lamps . . . quartz lamps, quartz tubes . . . metal rods . . . all have distinct advantages depending on application, heat rating desired, processing speed and often, cost.

One is right for *your* purpose. The advantage of dealing with a supplier experienced in *all* types is obvious. Fostoria has the advantage that comes from being the pioneer in manufacturing radiant equipment, with skill and know-how to help you choose the right type of infrared.

## Q Is your supplier unbiased in his recommendations?

Your experience in purchasing any kind of equipment tells you that getting a truly unbiased opinion from a company making only *one of many types*, is rather unlikely. So it is with manufacturers in the infrared field. Many concentrate on one type of radiant oven.

Today, Fostoria is the one firm making equipment that accommodates *all* practical and accepted sources of radiant heat. No heat sources are made at Fostoria. Consequently, no axe to grind.

## Q Will your oven be engineered for your job?

Like a carpenter who attempts to build a boat, even an ordinary sheet metalsmith can build an infrared oven. But one thing is sure, neither boat nor oven will be the fine piece of equipment that gives the satisfaction you want.

Designing and constructing an efficient, economical infrared oven involves (1) selecting the proper heat source, (2) determining correct oven shape, (3) laying out proper interior, (4) applying the right amount of heat, (5) providing suitable controls and accessories. To get the highest efficiency possible at minimum operating costs, all of these factors are considered before Fostoria engineers the radiant oven best for your needs.

## Q Is your supplier soundly established?

Let's face it, all of us have more confidence in the recommendations of a doctor whose shingle is aged with practice —and a bank with substantial assets. So it is similarly reassuring to know you are buying an infrared oven from a company with integrity. One who will back up your purchase 100%.

Supplying infrared ovens to thousands of users over the past 20 years, Fostoria is the kind of financially sound, and highly rated corporation you will find it rewarding to deal with.

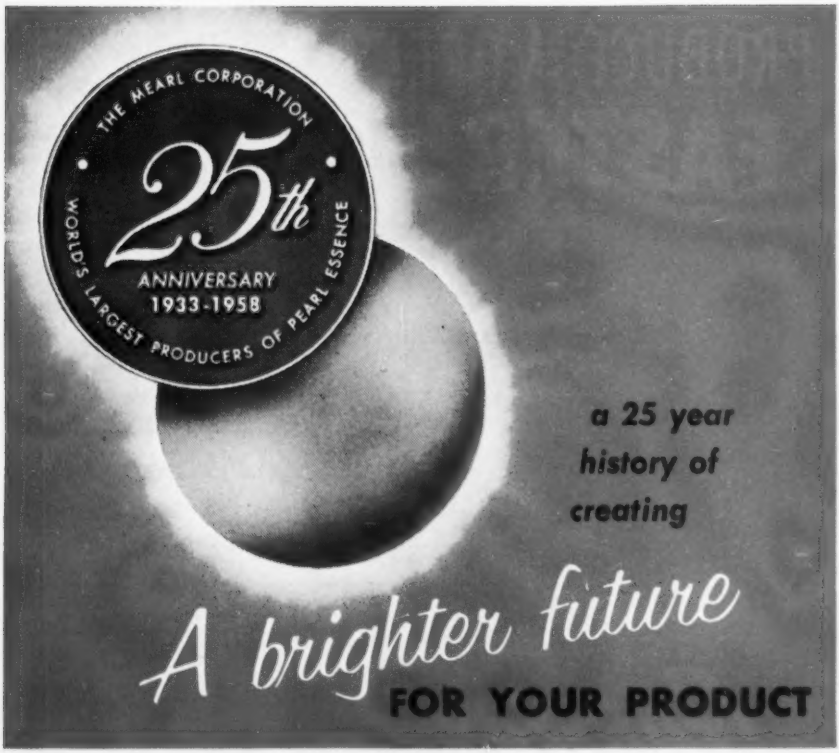
## Q Can you get service after the sale, too?

Whether buying a machine tool, lift truck or radiant oven, often the *service* you will get is quite as important to consider as the purchase itself. Fostoria established a nationwide network of trained engineers to give top-notch service *before and after the sale*. That means proper installation—and continuous performance with economy.

**Send for a free copy of "Radiant Heat—Applications Unlimited"—our 20-page illustrated booklet on infrared ovens. If you include data on your applications we will gladly include recommendations in our reply. Write to Department 922.**

**THE FOSTORIA PRESSED STEEL CORPORATION • FOSTORIA, OHIO**

**For more data circle 318 on Postpaid Card**




A brighter sales future often requires no more than the unusual lustrous effects of Mearlmaid Natural Pearl Essence and Nacromer Synthetic Pearl Essence. They may be the idea you have been looking for to multiply the sales power of your product.

For twenty-five years, The Mearl Corporation has pioneered the use of these pigments. Used initially as a finish on jewelry and a few related items, the range of applications has expanded widely. Today, these pigments are used for lighting fixtures . . . for wood or metal furniture . . . for plastic upholstery fabrics . . . for decorative papers . . . for cosmetic packaging . . . and for countless other products.

As a surface coating mixed with ordinary coating materials and applied by standard methods, or, compounded directly into many plastic resins, a thousand and one new decorative and functional uses are within your reach. The application of Mearlmaid Pearl Essence or Nacromer to your product may provide the sales appeal you have been looking for.

Write today for complete information.

**the Mearl corporation**
***WORLD'S LARGEST PRODUCERS OF PEARL ESSENCE***

**124 EAST 40th STREET**
**NEW YORK 16, NEW YORK**

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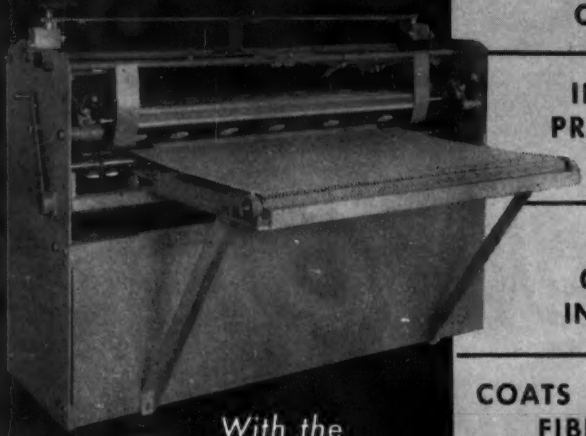
# PRODUCE MORE! FASTER!



With the

## GASWAY ROLLACOAT

UP TO 50% LESS PAINT COST

APPLIES MANY TYPES OF COATINGS

INCREASES PRODUCTION RATES

LOW ORIGINAL INVESTMENT

COATS WOOD, METAL FIBREBOARDS CARDBOARDS, PLASTIC

BETTER QUALITY FINISHES

HIGHER LABOR EFFICIENCY

*SEND THIS COUPON TODAY OR WRITE FOR FULL DETAILS*

GASWAY CORPORATION
6463 No. Ravenswood Avenue, Chicago 26, Illinois
Please send me complete information on Gasway Equipment for rollercoating

Name_____ Title_____
Company_____
Address_____
City_____ State_____

GASWAY CORPORATION
6463 No. Ravenswood Ave.
Chicago 26, Illinois

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# Now! A completely new ACP CHEMICAL TREATMENT package for aluminum fabricators

## For etching and de-smutting

A NEW ALUMINUM ETCHANT (Aluminum Etchant No. 33) specifically designed to insure a consistently uniform etch pattern and etch rate without scale buildup on tanks or coils in industrial waters of any hardness.

A NEW DEOXIDIZER (Deoxidizer No. 1) which produces at room temperature a mildly etched surface that is ideal for spotwelding, de-smuts aluminum, and provides an excellent surface for subsequent treatments with ALODINE, or lacquering.

## For protective coating

THE NEW ALODINE 1000 LIQUID, which produces a clear protective coating and reduces processing costs while maintaining top quality.

THE NEW ALODINE 400 PROCESS, which greatly improves the paint bonding qualities of aluminum and can be used as a decorative finish. It also materially reduces glare and improves the weathering characteristics of the metal.

For detailed information about these entirely new ACP chemical treatment products and processes for the aluminum fabricator, write us at Ambler.

ALODINE is a registered trademark of Amchem Products, Inc.

## Amchem Products, Inc. Ambler 14, Pa.

Formerly AMERICAN CHEMICAL PAINT COMPANY

CHEMICALS ACP PROCESSES

DETROIT, MICH. • ST. JOSEPH, MO.
NILES, CALIF. • WINDSOR, ONT.

*New Chemical Horizons for Industry and Agriculture*

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DU PONT PRODUCT NEWS
REG. U.S. PAT. OFF.

**QUESTIONS FROM THE FLOOR** are answered during a Du Pont cost-analysis seminar by technical representatives George Hetrick and Dave Haring (left to right). Fred Low, technical service manager of Du Pont's Chlorine Products Division, stands by as moderator. Cost-analysis specialists are featured speakers at Du Pont Cost Seminars.

# Unique Du Pont seminars point up advantages of cost analysis in metal cleaning

As an extra service for their customers, distributors of "Triclene" D trichlorethylene are scheduling seminars conducted by Du Pont metal-cleaning specialists. The purpose of these meetings is to give metal fabricators like yourself helpful information about modern metal-cleaning methods and a basis for comparing them.

High point of the seminars is a detailed discussion of Du Pont's new cost-analysis service. This is a method of accounting, based on accepted principles, that helps you determine the complete cost of your present cleaning operation . . . pinpoint out-of-line costs and show how they can be reduced. This new service can help you improve your current operation or help you select the most efficient process if you're planning to expand.

You can get full details about the seminars and cost-analysis service through your distributor of Du Pont "Triclene" D trichlorethylene. He works hand in hand with Du Pont technical representatives to bring you the best metal cleaning available at lowest possible cost. Get in touch with him today, or mail coupon at right.

## Answers to questions most frequently asked at the Du Pont cost seminars:

**Q.** Your cost analysis sounds fine, but how am I going to get the basic information needed? I don't keep a fine breakdown of cleaning costs.

**A.** We have recently prepared information that will give you all the instructions you need for making a cost analysis. Included are data for obtaining estimates when you need them. Also, Du Pont technical men are always available to help you.

**Q.** Do all trichlorethylenes have the same effect on cleaning costs?

**A.** Not at all! "Triclene" D contains an *exclusive* combination of neutral stabilizers that virtually eliminates rejects and permits easier, less frequent degreaser cleanouts. Naturally, these factors have a definite influence on metal-cleaning costs.

**Q.** Why has Du Pont spent the time and money to establish this cost-analysis service?

**A.** For two reasons. First, an accurate method for analyzing metal-cleaning costs has long been needed in this field. Du Pont, pioneer of vapor degreasing with synthetic solvents, is in the best position to offer this needed service. Second, we believe that in most cases we can prove to you that vapor degreasing is more economical than alkali washing for metal cleaning. If we can, and if you choose our "Triclene" D trichlorethylene, we *both* stand to profit.

**Q.** Anything new coming up in vapor degreasing?

**A.** Yes, indeed. A process now finding commercial acceptance combines degreasing and painting in the same degreaser. A further advance still in the development stage integrates phosphatizing between degreasing and painting

# *FOR MODERN METAL CLEANING*

**New laboratory** houses plant-scale equipment for demonstration and customer service.

## New DuPont laboratory helps your distributor provide more service

A phone call to your "Triclene" D distributor will make available outstanding technical service from a Du Pont Solvents Technical Representative. Service that's yours without obligation. What's more, this service is now given extra support by the facilities provided at the new Du Pont Sales Technical Laboratory at Wilmington, Delaware.

Your Du Pont Solvents Technical Representative is up to date on the latest developments in the field. He works closely with your "Triclene" D distributor and together they can keep you posted, provide you with useful literature on improving your metal-cleaning operation. Remember, it's their job to keep your degreasing setup at peak efficiency.

**Want more facts about vapor degreasing with "Triclene" D?** Free booklet tells how vapor degreasing works, shows types of equipment, points out many cost-saving advantages. Just mail coupon for your copy

cut out and save

## Use this handy check list for evaluation of metal-cleaning processes

You'll find the chart below helpful in selecting a metal-cleaning process for your new plant or to replace existing outworn equipment. Engineers who consider all of the factors listed frequently find that the speed, flexibility, quality and economy of vapor degreasing make it the best answer to their cleaning needs. Your local Du Pont Solvents Technical Representative will be glad to help you evaluate vapor degreasing in light of your requirements. You can arrange to have him call through your distributor of "Triclene" D trichlorethylene or through the local office of the Electrochemicals Department. Arrange for a call today!

| | VAPOR DEGREASING | ALKALI WASHING | EMULSION CLEANING |
|---|---|---|---|
| **SOILS—Can it readily remove?** | | | |
| 1. Stamping and machining oils | Yes | ( ) | ( ) |
| 2. Most polishing and buffing compounds | Yes | ( ) | ( ) |
| 3. Drawing compounds | Yes | ( ) | ( ) |
| 4. Quenching oils | Yes | ( ) | ( ) |
| 5. Water-emulsion cutting oils | Yes | ( ) | ( ) |
| 6. Shop dirt | Yes | ( ) | ( ) |
| 7. Paints | Many | ( ) | ( ) |
| **METALS—Can it clean thoroughly without etching?** | | | |
| 1. Steel | Yes | ( ) | ( ) |
| 2. Aluminum | Yes | ( ) | ( ) |
| 3. Other nonferrous metals | Yes | ( ) | ( ) |
| 4. Plastics | Many | ( ) | ( ) |
| **OTHER MAJOR CONSIDERATIONS** | | | |
| 1. Fast cleaning action? | Yes | ( ) | ( ) |
| 2. High capacity—low investment? | Yes | ( ) | ( ) |
| 3. Good penetration into recesses? | Yes | ( ) | ( ) |
| 4. Soil redeposition? | None | ( ) | ( ) |
| 5. Foaming problems? | None | ( ) | ( ) |
| 6. Do parts emerge dry? | Yes | ( ) | ( ) |
| 7. Handle all shapes and sizes? | Yes | ( ) | ( ) |
| 8. Waste-disposal problem? | None | ( ) | ( ) |
| 9. Utility requirements? | Low | ( ) | ( ) |

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department PF-9, Wilmington 98, Del.

- ☐ Please send me your booklet on vapor degreasing.
- ☐ Please send me more information on your new cost-analysis method.
- ☐ Please have your representative call for an appointment.

*Name*_____ *Position*_____

*Present method of cleaning*_____

*Firm*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

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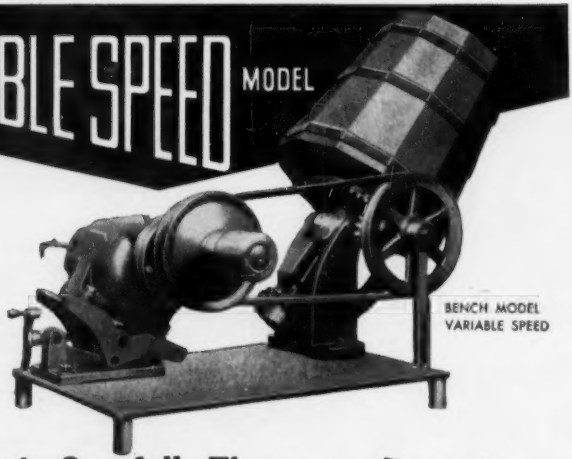
## INVESTIGATE THIS TIME-SAVING

# VARIABLE SPEED MODEL



BENCH MODEL
VARIABLE SPEED

Bench-Type Single Speed

No. 5—Single Speed

No. 5—Variable Speed

No. 5A—Single Speed

No. 5A—Variable Speed

No. 6—Single Speed

No. 6—Variable Speed

## Note Carefully These IMPORTANT POINTS

Barrels can be filled with parts or abrasive—*while running.*

Work can be watched — samples removed for inspection — *while running.*

Angle can be changed for best abrasive or polishing action — *while running.*

Barrels can be emptied by tilting to pouring position — *while running.*

Barrels are made in various sizes, shapes, and materials. They are easily replaced.

If You're a Tumbler, Send for This NEW CATALOG

**THE HENDERSON BROS. COMPANY**

*"The Tumbling Barrel People"*

138 SOUTH LEONARD STREET
WATERBURY, CONNECTICUT

SINCE 1880 DESIGNERS AND BUILDERS OF TUMBLING BARREL EQUIPMENT

For more data circle 323 on Postpaid Card

# Phosphating processes now available...to fit any production or cost requirement!

# New Turcoat concept puts better paint adhesion within the reach of everyone!

In the past, phosphating processes—due to their high initial costs—have principally been utilized only by the larger plants. Realizing the need for better paint adhesion and corrosion resistance among many plants who have not previously utilized phosphating, Turco has broadened its Turcoat line and now offers—for the first time—phosphating processes that can be tailored to fit your individual *production* and *cost* requirements. Turcoat processes currently in use range from small, inexpensive 3-tank set-ups all the way to elaborate 11-stage spray washing systems. With Turcoat, paint is anchored uniformly... permanently. Should accidental gouging occur, there is no corrosion "creep-back" under the paint. Turcoat systems quickly pay for themselves by slashing number of rejects and other problems involved in improper preparation, by minimizing packing and crating costs, by establishing and assuring customer preference.

TURCO

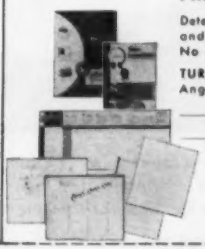
**TURCO PRODUCTS, INC.**

**Chemical Processing Compounds**

6135 So. Central Ave., Los Angeles 1, Calif.

*Offices in all Principal Cities*

Mfg. in Canada by B. W. Deane & Co., Montreal



***FREE* PHOSPHATING ANALYSIS KIT!**

Determine how *your* products are adaptable to phosphating and to the many paint adhesion advantages it offers. No obligation.

TURCO PRODUCTS, INC., 6135 So. Central Ave., Los Angeles 1, Calif.

_____ Please send free Phosphating Analysis Kit

_____ Please send field engineer for on-the-job survey

Name _____ Title _____

Firm _____

Address _____ PF

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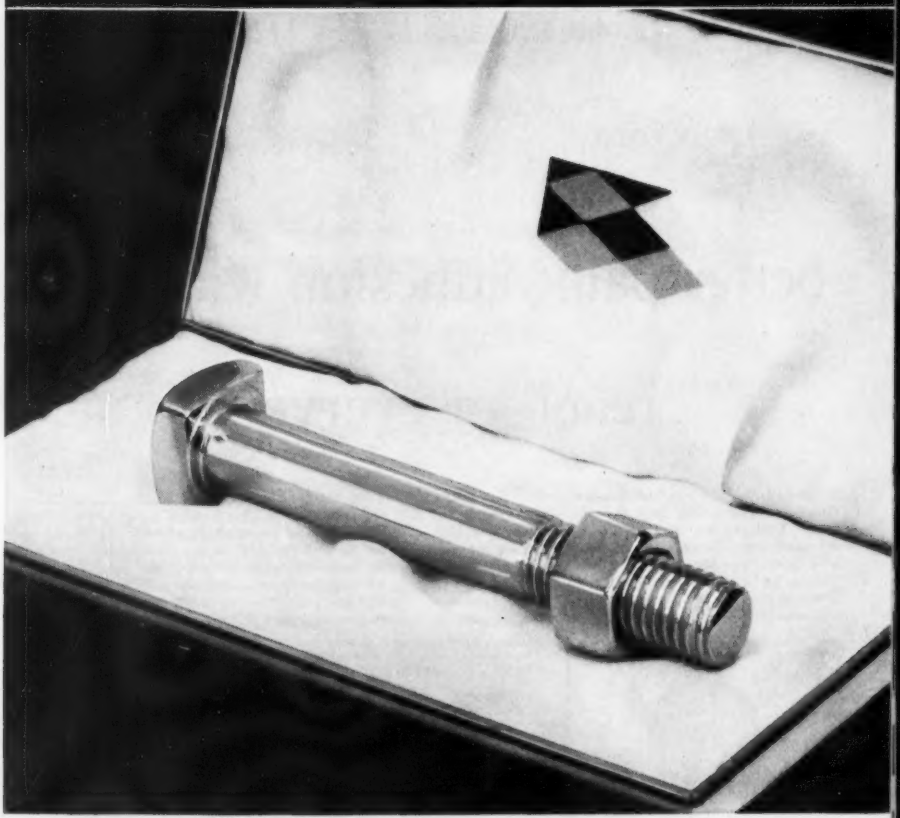
# HERE'S YOUR REWARD

***for telling us what you want in brighteners--***



***Your Allied Finishing Systems Engineer will be glad to discuss the benefits of ISOBRITE Brighteners in your operations. He's listed in your 'phone book under "Plating Supplies". Or, write for technical data and product list giving details of your operations.***

# ISOBRITE™

## PLATING BRIGHTENERS

### Now—28 ISOBRITE BRIGHTENERS For Zinc, Cadmium, Copper and White Brass HAVE THE *FOUR* BIG FEATURES YOU ASKED FOR!

When the Allied line of brighteners, now known as ISOBRITE, had the famous ARP trademark on them, we made a survey to find out exactly what *you* wanted most in brighteners. Your answers helped guide our research and development staff in evaluating and consolidating our new line.

Now, here are the results—the industry's most complete line—28 *ISOBRITE Brighteners with these most-wanted features:*

**1. LONGER LIFE . . .** Your own records will show ISOBRITE Brighteners give longest possible life in rack or barrel plating operations.

**2. BRIGHTNESS . . .** You'll see for yourself that ISOBRITE Brighteners give a diamond-like sparkle that just can't be matched.

**3. THROWING POWER . . .** Even if your product has deep recesses, you'll get a uniform, all-over brightness that only ISOBRITE Brighteners can give you.

**4. WIDER BRIGHT RANGE . . .** ISOBRITE Brighteners operate efficiently over exceptionally wide current density ranges and have greater tolerance for temperature change.

Remember, there's an ISOBRITE Brightener especially designed for your specific operations—whether you're rack or barrel plating zinc, cadmium, copper or white brass . . . an ISOBRITE Brightener that is entirely compatible with most other brighteners. Don't just order brighteners—specify ISOBRITE. There *is* a difference!

*Allied Research Products, Inc.*

4004-06 E. Monument St., Baltimore 5, Md.
Branch Office: 400 Midland Ave., Detroit 3, Mich.

***Chemical and Electrochemical Processes, Anodes, Rectifiers, Equipment and Supplies For Metal Finishing***

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# Speed

## *Diamond CPA 1800 speeds up chrome-plating time!*

DIAMOND CPA 1800 is *the additive* for chrome plating which expands tank capacity, improves throwing power and the metallurgical character of chrome plate. It's the modern teammate of DIAMOND CHROMIC ACID!

And, when you order your chromic acid from Diamond, you get the latest facts on *all* phases of chromic acid application, research and testing. Facts that can help you lick a production problem, quality problem, or research problem.

So, call your Diamond Representative, or your nearby Diamond Distributor, now. They can help you get quality chrome-plating jobs *every time*, based on our broad experience with plating. DIAMOND CHROMIC ACID is available where and when you need it. DIAMOND ALKALI COMPANY, 300 Union Commerce Building, Cleveland 14, Ohio.

**Diamond Chemicals**

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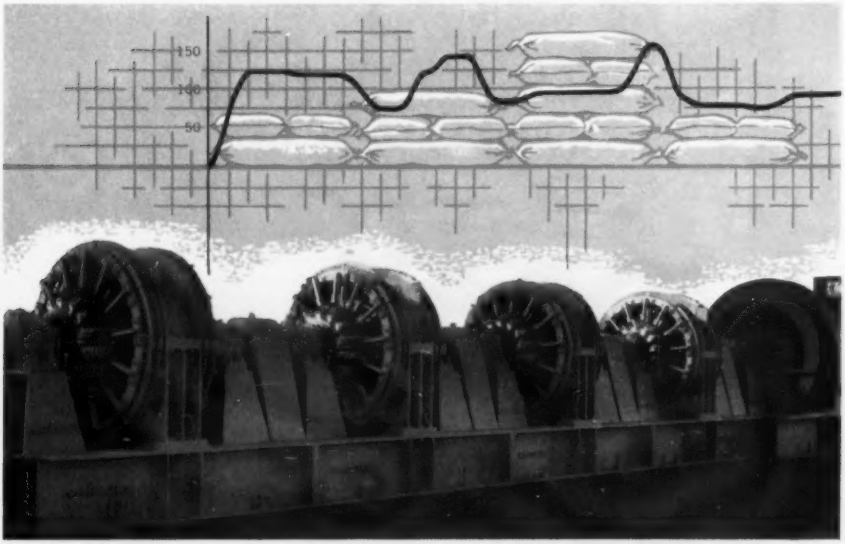
# EXTRA **stamina**... WHEN YOU NEED IT MOST




## ...PROOF THAT MOTOR GENERATORS ARE YOUR MOST DURABLE FORM OF POWER CONVERSION

*Chandeysson* generators are built with high overload capacity—up to 50% momentarily

Stamina and durability are built right into Chandeysson Motor Generators to give you more power when you need it most . . . in an emergency. You get overload capacity as great as 50% momentarily and 25% for 2-hour periods . . . without distress or damage. All *this* is the result of Chandeysson's sound engineering, painstaking design, specialized craftsmanship, and thorough testing.

**Stamina** is just one of many reasons why the plating industry *insists* on Chandeysson low-voltage generators for direct current power needs . . . for extra capacity to meet emergencies at the lowest possible cost.

*For full information, write now for new booklet D-103.*

**CHANDEYSSON ELECTRIC COMPANY**

4082 Bingham Avenue • St. Louis 16, Missouri

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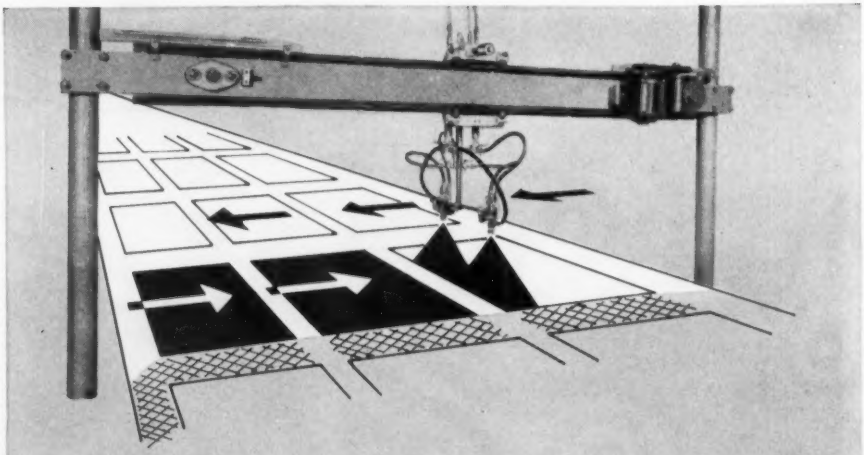
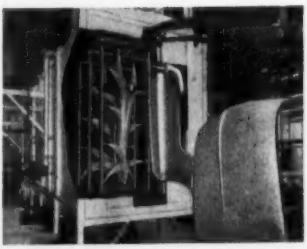
# DeVilbiss Automatics...a cost-



DeVilbiss Automatic Spray Machines, in three basic types, feature speed of application and uniformity of finish not possible by any other coating method.
(1) Automatic Transverse Machines coat flat or contoured shapes. (2) Automatic Rotary Machines spray all types of small shapes. (3) Automatic Chain-On-Edge Machines spray all types of irregular shapes inside and out.

*DeVilbiss Spray Guns.* Complete range of models for maximum efficiency for all production requirements. Send for Catalog IE-E.

*DeVilbiss Flo-Coaters.* Save manpower, floor space. Generally used for prime- or single-coat applications. Write, stating requirements.



# saving answer to coating problems

## You can increase rate of production, improve quality of your work, and reduce costs to fraction of manual methods!

Complete mechanization with DeVilbiss Automatics eliminates variation of manual operation and boosts production—in many cases 500% or more.

Gun positions are precisely set to coat your product quickly, uniformly, with accurate lapping and minimum overspray.

This precision means greater uniformity of spray-applied film; assured uniformity of color, luster, and texture of finish. Use of materials is carefully established and maintained; rate of production is constant.

What's more, you can know in advance whether automatic painting with DeVilbiss is practical. We will test-run your product in the DeVilbiss Laboratory without any charge or obligation. Call our nearest branch office; or write us direct for Series I-8000 Bulletins on automatic spraying.

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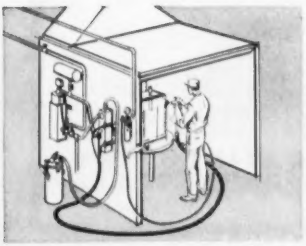

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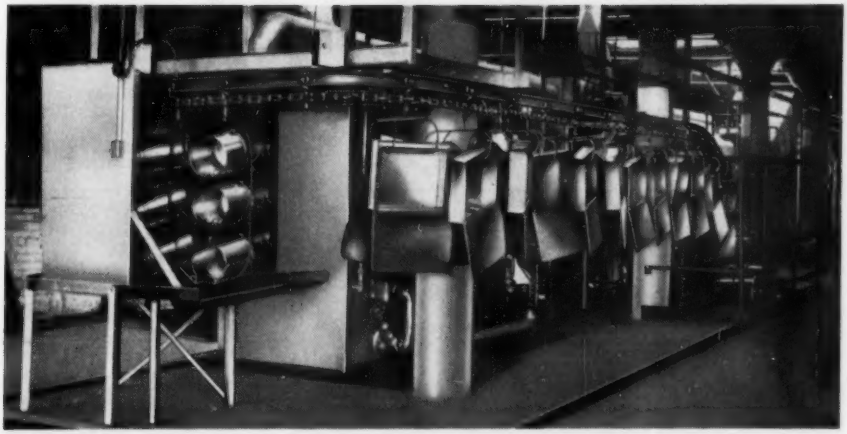

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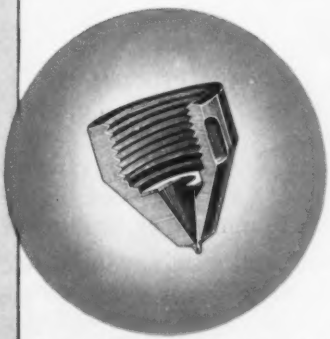
# Deburring and Cleaning
# 8 TIMES FASTER — and Better
# by Liquid Honing with EXOLON FASTBLAST

Photo courtesy Vapor Blast Mfg. Co., Milwaukee, Wisconsin.



The almost microscopic holes in this Diesel fuel injector cup were deburred and cleaned by Liquid Honing with EXOLON FASTBLAST. And, best of all, it produced a smooth surface that promoted better fuel flow and cut down gum deposits — all at a saving of 87.5% over conventional methods.

If you have a finishing operation, let our technical and research staff estimate your savings by changing to this profit making method! Mail coupon below for fast service!

Liquid Honing is a method using EXOLON FASTBLAST (aluminum oxide) abrasive in particles so small they can be suspended in a slurry and thrown at high speed against the work to be finished. Scales, burrs, carbons, oxides are quickly removed — in fact one man and one machine equalled the former production of eight men using conventional methods in the deburring and cleaning of the Diesel fuel injector cup illustrated.

The rate of finish is controlled by varying the air pressure, abrasive size, type and concentration, blast angle and distance of nozzle from the work. The abrasive mesh sizes are usually 80, 100, 150, 180, 220, 240, 320, 400, and 600.

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***says Mr. E. A. Nelson, General Manager, Imperial Lighting Products Company.***

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**THE SOLUTION:** A Binks semi-automatic spindle spraying machine. Rotating vertical spindles, mounted on a conveyor, spin the parts to be finished. As the parts pass the operator he coats them quickly and uniformly using a manually operated Binks Model 18 spray gun. The spindles are spaced to accommodate large parts on alternate spindles or smaller parts on every spindle.

**THE RESULTS:** So gratifying, according to Mr. Nelson, that a second Binks semi-automatic spindle machine was installed. Both machines have more than paid for themselves. A third, completely automatic, machine has been ordered for production-rate finishing of small parts.

- Automatic parts handling speeds production
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- Rejects reduced

**Free analysis and engineering help:** If you would like to know what production rates or costs you could obtain with Binks semi-automatic or automatic spraying machines, Binks research department will run actual test on *your* products and supply you with a detailed report. Just call your nearest Binks Branch Office or write us direct.

General view of the semi-automatic machines.

Faster finishing of higher quality is made possible by this Binks installation at Imperial Lighting Products Company, Latrobe, Penn.

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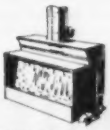

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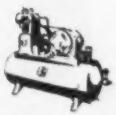

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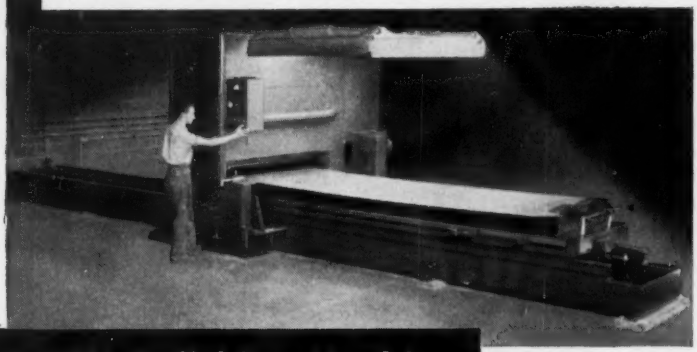

# A HILL Polishing Machine of *YOUR OWN* will afford you important savings...

- *By eliminating mill extras.*
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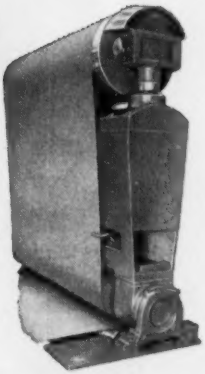
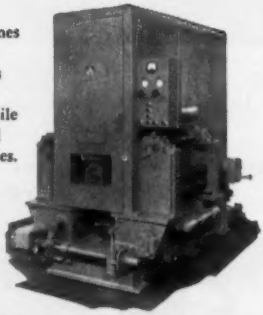
- *By enabling you to prepare the correct surface finish to meet each individual job need.*



● HILL polishing machines are now saving important percentages for manufacturers supplying the dairy and sanitation fields, for automobile bumpers, engravers plates and a wide variety of other industries.



HILL Pinch Roll type with vertical two roll head for polishing strip. Can be used singly or in multiple units for line production.

**IT'S MOSTLY IN THE HEAD**

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editorial

# How Well Are You Selling Your Abilities?

All of us advance progress by selling something of ourselves that we can contribute to the progress, development, or success of the enterprise with which we are associated. This is true for salesman and engineer alike.

There is "sell" even in the performance of a routine job. If we perform routine jobs with energy and enthusiasm, we are selling the fact that our abilities are greater than the immediate, routine job requires.

Top management in an alert, progressive organization is always on the lookout for people who show promise of being capable of assuming greater responsibilities. How can we bring our abilities to the attention of management? How can we "sell" ourselves? Here are a few suggestions that may be helpful:

Show enthusiasm, interest, and willingness to work hard.

Demonstrate technical and professional skill.

Make your written reports clear, concise, readable.

Do not attempt to by-pass your immediate supervisor; be a "team player."

Always be sure of your facts; then in presenting the facts, show ample evidence to support them, even though they are obvious to you.

Show that you can work well with people and can persuade them to accept your ideas without giving offense or being dictatorial.

Contribute ideas for the advancement of the business; even if they are not adopted, you have shown that you are interested in more than just your pay check.

A disillusioning experience for many engineers when they enter industry is the discovery that they must "sell" management on the correctness of their recommendations, even though to the engineers the facts of the case are self-evident. Facts are stubborn things, but a pleasant and persuasive manner can help gain acceptance of and recognition for the facts.

It may be equally disillusioning to realize that abilities must be sold also. They must be brought to the attention of management in such a way that they are recognized, so that the individual concerned receives proper recognition and advancement. Only by proper selling of our abilities and specialized skills can we achieve the desirable situation of having a job that is commensurate with our ability to perform.

Remember: it is important to do a good job; it is equally important that the boss knows you're doing it!

Ezra A. Blount

—EDITOR

# Cadillac Fights Corrosion

By H. MAHLSTEDT
Production Manager, Plating Products
Metal & Thermit Corporation
Rahway, N. J.

*Fig. 1—Bumper extension which contains exhaust outlet offers a number of curved surfaces, always a problem in plating. Bright crack-free chromium plating process covers piece thoroughly, improves corrosion resistance.*

**Plating metals that require a bright decorative finish** and good corrosion resistance has been a problem for platers since plating began. It is difficult to find a plate that has both characteristics and yet is economical for production use. And every plater is always on the lookout for a plate that will look better than his present product as it leaves the salt spray chamber.

One of the most important applications of such a finish is for automobiles. Bumpers, bumper extensions and exterior trim have long presented problems in finishing. Other applications have been nearly as troublesome.

The practice in finishing automobile bumpers and trim has been to plate bright chromium on undercoats of copper and/or nickel. This has been the custom since the introduction of chromium plating in 1927. Prior to that, nickel alone was used as the decorative finish, but it had to be protected with a clear coating to prevent dulling through corrosion.

While chromium plating was a vast improvement over straight nickel as a finish, chromium, too, presented problems. The chief difficulty was the cracks, microscopically small, that were inherent in any chromium plating thicker than 0.00002 inch.

These cracks, although not usually apparent to the naked eye, were breaks in the finish and thus defeated one of the purposes of the plating: corrosion resistance. Attempts to increase the thickness of the chromium plating only increased the size and number of the cracks.

These breaks in the finish apparently set up stresses in the undercoatings, especially when the deposit thickness of chromium exceeds 0.00001 inch. This causes the copper and nickel platings to crack, also, exposing the basis metal to the atmosphere.

***One of the biggest advances in the plater's fight against corrosion in recent years is the advent of crack-free chromium. Cadillac pioneered its use on automotive bumpers. Here's the story of how CFC improves corrosion resistance and the results of a year's production use . . .***

In use on automobiles, such a finish with open cracks permits the basis metal, usually steel, to be exposed to a number of corrosive elements — salt water, the result of melting snow and ice on the streets with salt; mud made by the mixing of water with acid soil, and in industrial areas corrosive fumes from factories. Near the ocean, salt air and blown spray from the sea is highly corrosive.

The acids picked up from the road and atmosphere enter the crevices of the deposit and form an electrolyte. The different metals set up an electrolytic cell, and corrosion results. If there were no electrolyte, or no openings, there would be no corrosion.

As it is, chromium, being a passive, therefore more noble, metal, acts as a cathode, while the other metals, being less noble, serve as the anode and hence corrode.

The products of this corrosion, being more voluminous than the electrolyte, wedge open the pores where the cracks intersect and also the cracks themselves. This action exposes still more of the basis metal to still further action.

Yet another factor which appears to enter into the deterioration of ordinary chromium finishes is the unequal coefficients of expansion of chromium, copper, nickel and steel. Changes of temperature are thought to bring about widening and narrowing of the cracks, hastening the breakdown of the finish.

These factors have been accepted by electroplaters all along, basically because there was no way of getting around them.

About five years ago, Metal and Thermit Corporation introduced a "crack-free" chromium plating process. Although the finish produced was satiny or matte-like, it was a step forward in the search for a chromium plate without cracks. It found a number of uses, especially in the hydraulic field.

Then about a year ago, the same firm perfected a bright crack-free chromium plating process.

Tests run at Metal & Thermit and at other laboratories indicated that the new finish could be plated to thicknesses of up to 0.0001 inch with no formation of cracks.

**One of the first users** of the new process was the Cadillac Motor Car Division of General Motors.

When the process was brought to the attention of Cadillac's Polishing and Plating Division, a number of tests were run on the new plating. Using an accelerated acetic acid salt spray test devised by that division, technicians there found that the new plating improved corrosion resistance of bumpers.

*". . . process is easier to operate than the bath for ordinary chromium . . ."*

Cadillac converted a hand tank in May, 1957, for trial use. The new process proved to have a number of advantages not found in ordinary chromium plating.

In June, 1957, Cadillac converted the first automatic plating machine to bright crack-free chromium plating. It has been in production ever since.

At the present time, in order to maintain production schedules, Cadillac is plating the new finish to thicknesses of 0.000035 to 0.000040 inch, with plans to increase thickness even more. Additional equipment will allow thicker plating.

Cadillac is plating on a basis metal of steel, with undercoats of approximately 0.001 to 0.002 inch of copper and nickel. Specifications call for a minimum deposit of 0.0007 inch of nickel.

**Plating Process Cycle**

The plating cycle as it is currently carried out at Cadillac:

1. Soak clean, 120 deg. F., 17 seconds.
2. Spray clean, 120 deg. F., 17 seconds (both using Northwest SC-4, ½ oz./gal.).
3. Cold water rinse.
4. Cathodic clean (Northwest 371, 6 oz./gal.) 140 deg. F., 17 seconds.
5. Spray rinse.
6. Cold water rinse.
7. Acid dip—5 per cent by volume sulfuric acid (plus Northwest AAA-1 and potassium iodide).
8. Cold water rinse.
9. Cold water rinse.
10. Chromium plate in Metal & Thermit's CF-520, 6-1/3 minutes, 115 deg. F.
11. Drag-out rinse.
12. Cold water rinse.
13. Warm water rinse.

The plating is done in a full automatic plating machine with total time for each cycle of 70 seconds—53-second transfer and a 17-second dwell. In the rinses, acid dip and soak and spray cleaners the time is slightly more than 17 seconds. It is never much more than 20 seconds.

The first cleaning operation is necessitated only by the fact that Cadillac does occasional spot buffing to brighten the surface prior to chromium plating. Otherwise the cycle would begin with the cold water rinse and go from there to the cathodic cleaning.

**Production Results at Cadillac**

Cadillac's use of the crack-free chromium plating process has shown that the coating produced has a number of advantages besides the absence of cracks and increased corrosion resistance, although the latter characteristic is the primary reason for its use.

For one thing, the bright crack-free chromium can be plated on bright stainless steel as well as on other bright surfaces; Cadillac has rejected fewer parts than before.

Still another advantage is that the bright crack-free chromium process is easier to operate than the bath for ordinary chromium: it activates the nickel well; throwing

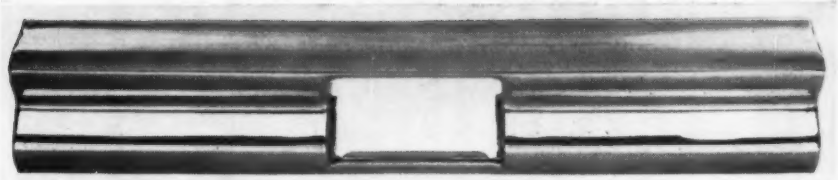

*Fig. 2—Rear bumper bar which has opening for license plate takes bright crack-free chromium plating satisfactorily, giving piece acceptable appearance as well as improved corrosion resistance. (Photographs courtesy Metal & Thermit Corp., Rahway, N. J.)*

and covering powers of the bath are better—an important advantage on parts where there are recesses.

When necessary, the bright crack-free chromium finish can be replated without stripping first.

Since the new bath is "self-regulating," reduction in supervision and "down time" have been experienced.

While the new process is obviously well suited to use in the automotive field, indications are that it can be used to advantage in a number of industries where excellent appearance and corrosion resistance must be obtained: furniture for outdoor use; bathroom and kitchen fixtures where parts are exposed to high humidity and the acid found in perspiration; high-quality pens and pencils; cigarette lighters; and decorative parts for household appliances such as television sets, where high heat can bring about rapid deterioration of finishes.

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*How a large hardware manufacturer is getting top results by plating lock parts with a copper-tin alloy bronze electroplate . . .*

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## *to its growing family of Bright Nickel Plating Processes*

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Among the many advantages of the SUPER NIBRITE BARREL NICKEL are its superior brightness, excellent leveling, ductility, ease of operation and control, tolerance to organic and metallic impurities, and its receptiveness to chrome plating.

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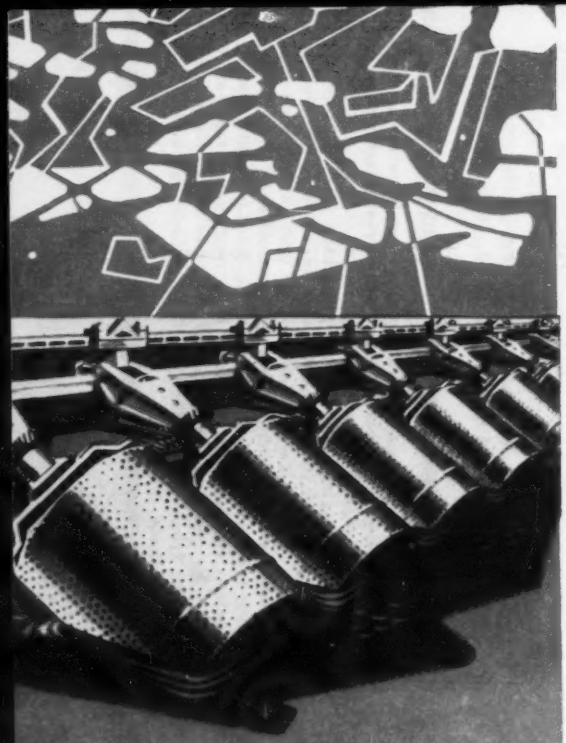
# Harshaw *Super* NIBRITE

## Barrel Bright Nickel Process

**Brightness.** The SUPER NIBRITE nickel plate is bright over a



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# Electrochemistry

## Part V

By FRED G. BRUNE
Manager—In Process Inspection
Chrysler Corporation
Missile Division
Detroit, Michigan

### Application of Principles to Nickel Plating

To see how principles discussed in previous installments of this series apply to a specific electrodeposit, let's examine a typical nickel plating solution to see what is in it and why and how it is used to apply nickel.

Nickel is selected as the solution to be examined for two reasons: it is the most important metal deposited, both in terms of quantity and diversity of use; and it is a solution that demonstrates many of the important factors in electrodeposition —anode passivity, polarization, pH, addition agents, control of pitting, and so on.

The typical bright nickel solution in use today contains nickel sulfate, nickel chloride, boric acid, primary brightener, secondary brightener, and anti-pitting or wetting agents. In terms of ions, it contains the sulfate, chloride, borate, and hydroxyl anions and the nickel and hydrogen cations. Each of these constituents will be considered individually to show why it is in the solution.

### Nickel Ions

The nickel ions' obvious function in the solution is to be available at the cathode to deposit on the work being plated. They also carry the current. As we have seen, the highest current density that can be used is a function of the anion concentration in the cathode film. This cathode film concentration, in turn, is dependent upon the concentration of nickel ions in the entire solution. Therefore, it is desirable to

**FRED G. BRUNE has been active in the plating industry for more than 25 years. He attended the University of Cincinnati as a cooperative student in the Department of Chemical and Metallurgical Engineering. He has been associated with the Lockland Div., Electric Auto-Lite Company and Marion Industries, Division of Motor Products Corporation. For the past several years, he has held a staff position at Chrysler Corporation.**

**Mr. Brune is a past-president of the Cincinnati Branch, American Electroplaters' Society. As a member of the Detroit Branch, he gave a most successful course in Electroplating last year. Mr. Brune is a member of the Electroplating Course Committee of the A. E. S.**

have a concentrated solution of nickel ions.

Since nickel sulfate is very soluble, large quantities can be dissolved easily to make up a concentrated solution. Keeping the nickel ion concentration high also lowers the resistance of the bath to current flow, which helps to improve the distribution of nickel plate.

**Hydrogen Ions**

Hydrogen ions in the solution help to carry the current. They also keep the pH of the cathode film low enough so that basic compounds cannot precipitate on the surface being plated to cause roughness and "burned deposits." Hydrogen ions are supplied by water, boric acid and sulfuric acid.

The hydrogen ions supplied by boric acid replace some of the hydrogen ions that plate out at the cathode. Boric acid is a weak acid. It does not dissociate as quickly as the strong acids, thus it can serve as a buffer to aid in maintaining a constant pH in the cathode film.

**Sulfate Ions**

The sulfate ions serve to carry the current. Most of the sulfate ions are furnished by the nickel sulfate, although some are supplied by sulfuric acid that is added to control pH. Nickel sulfate is used primarily because it supplies nickel ions while not causing undesirable side effects: the sulfate ion is stable, is not oxidized at the anode nor reduced at the cathode; it does not volatilize; it is not as corrosive as some of the other nickel salts. Nickel sulfate is also one of the least expensive nickel salts.

**Chloride Ions**

Chloride ions are added primarily to assist in anode corrosion. The pure nickel anode tends to passivate. This is caused by polarization. The chloride ion promotes dissolution of the nickel anodes. It is logical to obtain the chloride ions

**Author's Note:** *This material was used in a lecture course in Electroplating, given as a part of the educational program of the Detroit Branch, A. E. S. The lectures were designed to explain in simple terms the principles of electrochemistry, and demonstrate to the plater the usefulness of these principles. During the course each student was given a copy of "Fundamentals of Electrochemistry and Electrodeposition," by S. Glasstone, as a source of more extensive explanation of electrochemical principles.*

by additions of nickel chloride, since nickel ions are needed in the bath anyway. Other chloride salts are used only when another metal ion is desired for some special property.

**Borate and Hydroxyl Ions**

Borate and hydroxyl ions are necessary evils—they are in the solution because they are associated with some other needed material. They do not play an important part in the plating process. Borate ions come from the boric acid, which is used because it is a good, stable buffer that is available at reasonable cost. Hydroxyl ions are part of the water, which is used as the solvent in this plating bath, as in most plating baths.

**Brighteners**

Electrochemistry explains the presence of the above constituents.

*"I'm well qualified — note the well-developed index finger for pushing buttons."*

Brighteners are not so easily explained. We know that they are important, that they serve a useful purpose and that they are responsible for much of the progress in nickel plating during the past 20 years. But it is not known exactly how they produce their brightening and leveling effects.

Brighteners may be divided into two groups: primary and secondary. Primary brighteners are less effective, but they can be tolerated in higher concentrations, and concentration is not too critical. Secondary brighteners are more effective, but lower concentrations must be used and the concentration is fairly critical. Typical brighteners include cobalt salts, aryl sulfonic acids, sulfanamides, sulfanimides, cadmium and zinc salts, formates, aldehydes, ketones, and amino polyarylmethanes.

**Anti-Pitting Agents**

One of the most common troubles encountered by the nickel plater is pitting. This condition is usually caused by the evolution of hydrogen bubbles at the cathode, which adhere long enough for the deposit to build up around the bubble and leave a pit that mars the appearance and decreases corrosion resistance.

One remedy for pitting is the addition of hydrogen peroxide, which is more easily reduced at the cathode than is hydrogen. Thus formation of hydrogen bubbles is prevented. Instead, hydrogen peroxide is reduced to water, which is harmless.

There are two difficulties with

use of hydrogen peroxide, however: it decomposes spontaneously and must therefore be replenished frequently; because it oxidizes organics, it cannot be used in bright nickel baths that contain organic brighteners.

**In bright nickel** baths various wetting agents are used to prevent pitting. The first such wetting agent used was sodium lauryl sulfate. Other similar compounds are now in general use. These materials prevent pitting by their high surface activity, which causes the gas on the cathode to become bubbles and float away. One problem encountered with wetting agents is that greases and oils will dissolve in the bath and cause trouble.

**Practical Control**

Since there are so many components in a nickel solution, control becomes a rather complicated task. Each of these components can be varied to modify the results, and in addition, certain impurities are present which can also affect the deposit. Thus in practice it becomes necessary to establish certain limits for each component in the solution and operate within these limits, varying only pH, current density, temperature, agitation and anode spacing to obtain the desired results.

As an example, I might tell you how I set up standard conditions for nickel plating in an automatic plating machine. Suppose I want to operate at 60 a.s.f. (amperes per square foot). I hold my nickel concentration fairly high. I also keep the nickel chloride concentration fairly high (if my equipment can stand it). The limit is based on my nickel salt additions. I start with the chloride concentration low and increase it until the desired range is reached. Then I add nickel chloride only to replace dragout. I hold boric acid concentration high so as to be able to plate at a high current density. My final bath composition is as follows:

| | |
|---|---|
| Nickel Metal | 11.5-12.5 oz./gal. |
| Nickel Chloride | 7.5- 8.0 oz./gal. |
| Boric Acid | 5.5- 6.0 oz./gal. |

Once established, I maintain this composition by regular analysis and replace those components that are depleted by dragout and consumption, as needed.

Having established limits of solution content, I proceed to the remaining variables. Temperature is 130 to 150 deg. F., depending upon the concentration of boric acid (higher temperature with increased boric acid content). pH depends upon the proprietary solution used, but whatever it is, it is controlled within plus or minus 0.5 of the recommended optimum for the bath. If, for example, the bath is operated at a pH of 3.0, I keep it between 2.9 and 3.1 by continuous addition of acid. If I encounter trouble with the deposits, I lower the pH to 2.5.

**Brighteners are added** in quantities directly proportional to the nickel content of the bath. Usually brightener additions are made by using a fraction that is determined by experience with a specific bath. For example, if the fraction is ¼, I add three per cent by volume of the primary brightener for a 12-oz./gal. solution of nickel. The secondary brightener is usually held to the middle of the range specified by the vendor.

Wetting agents are also controlled within the mid range specified by the vendor of the solution.

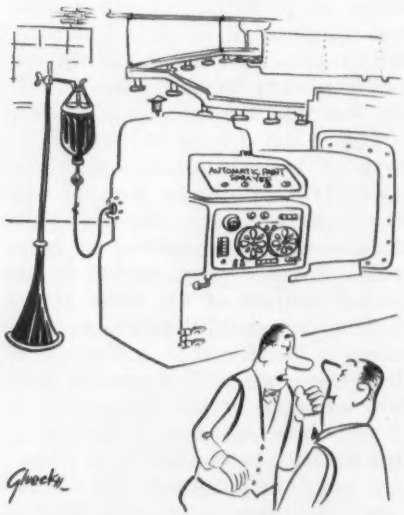
With experience, the amount of addition agents and acids that must be added to keep the solution within the limits specified can be calculated so that this amount is added routinely on an hourly basis.

Operating under these conditions, an experienced operator of a Hull Cell can predict trouble within three to five days and prescribe corrective action to avoid the trouble.

It has been my experience that electrolytic purification and filtration through activated carbon are essential for high-quality nickel plating. The methods of electropurification are listed in most plating manuals. Five pounds of activated carbon will usually take up two gallons of wetting agent and one gallon of secondary brightener, but will still take up other impurities. Continuous filtration during operation and over week ends is beneficial.

**Trouble Correction**

If trouble occurs, I usually raise the solution temperature; increase the boric acid concentration; lower the pH; add primary brightener. Pitting troubles are usually corrected by adding wetting agent. If the deposit becomes gray, secondary brightener can be added.




*"We have to feed it paint intraveneously—the bloomin' thing's in a run-down condition."*

★ ★ ★

*Coated Abrasives—Modern Tool of Industry.* Published under auspices of Coated Abrasive Manufacturers' Institute. Copies may be obtained by writing to McGraw-Hill Book Information Service, 327 W. 41st St., New York 36, N. Y. 452 pages. Price, $8.50.

This book brings together a great deal of authoritative information to aid in the selection and use of coated abrasives. The nature of various types of abrasives, their economic advantages, applications, and efficient methods of use are covered.

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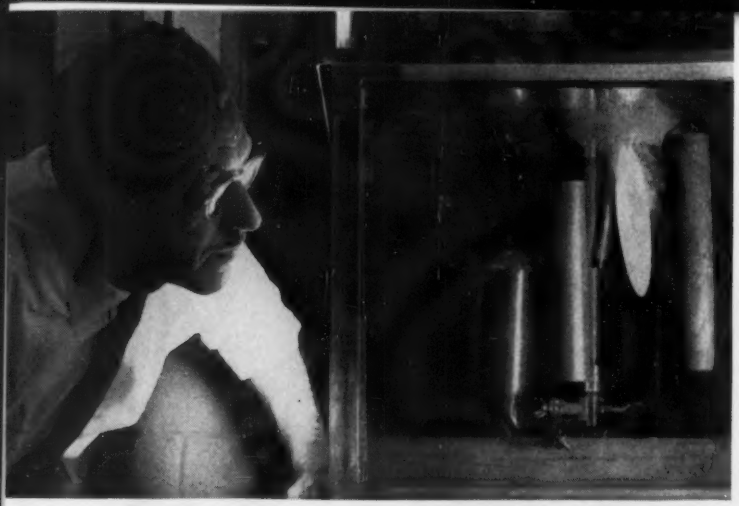


*Fig. 1—Transparent electroplating tank of "Lucite" acrylic resin permits study of anode corrosion in copper plating. These tests make possible the selection of suitable types of copper anodes for Du Pont plating baths.*

# Finishing Research: A New Laboratory

**Du Pont recently opened a five-million-dollar laboratory** devoted to sales-service and application research for the Electrochemicals Department. The 130 chemists, metallurgists and chemical engineers that staff this laboratory have developed several interesting and valuable processes and products for use in the finishing industry, have other processes that show promise now under development.

The Electrochemicals Department has long been concerned with the electrolysis of fused salt to produce sodium metal and chlorine. From these products have come several other useful products — sodium cyanide, sodium peroxide, trichlorethylene, perchlorethylene.

Research directed toward finding new uses and applications for these products has led to the development of the wide variety of products now under the wing of the "Elchem" Department. Those useful to the finishing industry include sodium cyanide, potassium cyanide, copper cyanide, zinc cyanide, hydrogen peroxide, sodium metal, trichlorethylene, perchlorethylene, methylene chloride, and polyvinyl acetate emulsions.

The Electrochemicals Laboratory is divided into sections according to the type of research and development work being performed. Three of these sections — Sodium Products, Chlorine Products, and Vinyl Products—are concerned with development work and research on products that are directly useful to the finishing industry.

**Sodium Products Developments**

Sodium Products has recently developed three new processes: one for high-temperature descaling, one

***A glimpse into the activities at Du Pont's new Electrochemicals laboratory . . . brief descriptions of recently developed copper plating processes, promising research on a solvent-applied phosphate coating and a new painting method . . .***

for high-speed copper plating, one for plating leveled copper.

**High-Temperature Descaling**

The high-temperature descaling bath consists essentially of sodium hydride in molten caustic. Metallic sodium and hydrogen are introduced into the bath and combine chemically to form sodium hydride — a very strong reducing agent. The sodium hydride in turn combines with the oxide component of the

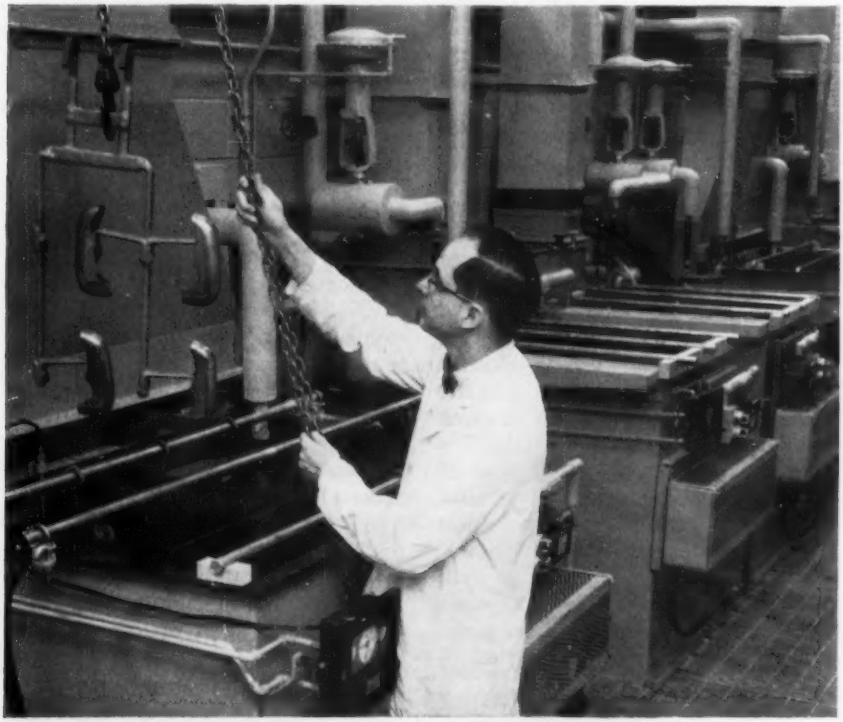
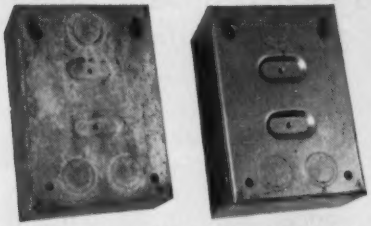


*Fig. 2—Copper plating automobile bumper guards in DuPont's new Electrochemicals Sales Service Laboratory at Chestnut Run. Facilities are also available for electroplating of zinc, nickel, chromium and other metals. All equipment is designed for ease of maintenance.*

# The BEST Finishes START with STANTITE Primers



*Stantite Spraying Primer was used on switch box at right only. Both boxes were sprayed with aluminum synthetic and were exposed to salt spray test for 500 hours. The results speak for themselves.*

Stantite Spraying Wash Primer is a two-package, new type rust inhibiting primer that improves the quality of *any* topcoat, air-dried or baked. The formula is concentrated to minimize the settling of zinc chromate. Fast drying . . .. exceptional adhesion to ferrous, non-ferrous metals and glass. Prevents "rust creep". Ideal base coat for lacquers, vinyls, alkyds, ureas, melamines, enamels, japans.

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scale to produce a thoroughly cleaned metal surface.

The Elchem laboratory unit contains about 400 pounds of the bath. Typical units in operation contain 50,000 to 100,000 pounds of the molten salts. Parts may be descaled by a 10-minute immersion in the bath followed by a water quench and then a bright dip in acid. This pickling removes the last traces of residual film. The appearance after pickling is bright—scale and smut have been removed.

Prior to the development of hydride descaling, removal of scale from stainless steel using acid alone required time cycles as long as 16 to 24 hours.

Du Pont is experimenting with bath operation at still higher temperatures. The possibilities of combining descaling and heat treating of metals in a single operation are especially intriguing.

### Copper Plating Steel Wire

Another major field of interest to Elchem is copper plating. This stems from the company's basic position as a manufacturer of copper cyanide, sodium cyanide and potassium cyanide.

Copper coated steel wire is used for transmission lines, telegraph and other electrical applications. At the present time, 30,000 to 40,000 pounds of copper are used each year to produce copper coated steel wire. Prior to the development of the plating process, all of this wire was produced by casting the copper around a steel core and drawing it into wire.

In the new plating process, the steel wire or rod enters the machine in the form of a precise helix and

rotates through the 60-foot-long machine. More copper is applied as the wire proceeds through the plating solution until finally as much as 37 per cent by weight is added. It is of interest to note that there is more than a mile of wire in the machine at one time. The wire, after being plated, is finally drawn to standard sizes varying from 0.04 to 0.3 inch in diameter.

Du Pont worked closely with National-Standard Co., Niles, Mich., in developing the new process. The Electrochemicals Dept. developed an electrolyte to meet the stringent needs of the process, whereas National-Standard engineered the equipment. It was necessary to produce very ductile copper with a strong bond to the steel surface.

High plating speeds were essential, with brightness and smoothness of the deposits equally important. All these requirements were met by incorporating additives in the bath.

Plating offers several advantages over the casting method:

1. Wider variety of types of steel can be used.
2. The product can be produced in longer lengths.
3. The plated copper is more uniform, varying less than one per cent in thickness around the periphery of the wire.

Three plating units are now in commercial operation, and Du Pont expects the electrolytic method to eventually replace the casting and drawing method which was used exclusively up until about a year ago.


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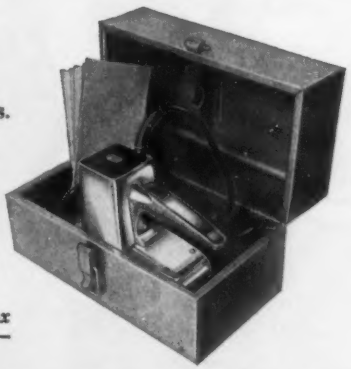

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**Plating Leveled Copper**

Plating of leveled copper is an even newer development and is of particular interest to the automotive industry.

Under present methods for manufacture of bumper guards, flat sheets of carbon steel are drawn to form the bumper guard. The resulting surface finish is relatively rough and resembles an orange in appearance. The rough finish is then polished with a coarse grit to knock off the peaks of the hills. The guards then are plated with about 0.001 inch of copper. In contrast to steel, which is difficult to finish to a mirror-like surface, copper is soft and the copper plated parts, which have been taken off the plating racks, are buffed to a high finish. They are then re-racked and cleaned prior to the final plating.

Finally, the bumper guards are plated with nickel, followed by a flash of chromium. In addition to the high cost of multiple operations, much of the copper is buffed off some areas, resulting in poor protection against corrosion.

If copper could be applied to the relatively rough polished surface and thereby produce a smoother finish, unracking, buffing and cleaning of the parts prior to nickel and chromium plating could be eliminated altogether.

The new copper plating process is aimed at accomplishing this goal.

*Fig. 3—To measure degreasing effectiveness and efficiency, parts to be degreased are first coated with a "manufactured soil" in the tank at the side of the operator, then baked, then sent to solvent degreaser.*

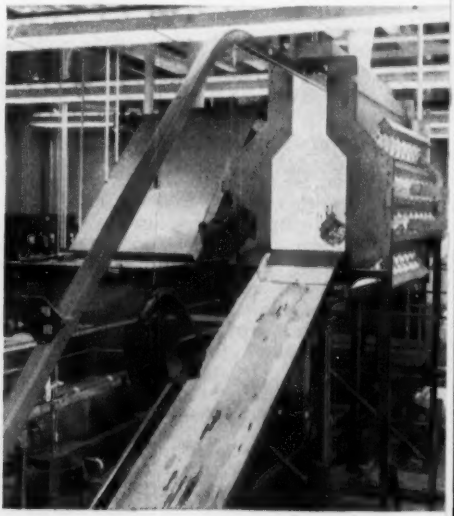

*Fig. 4—Parts dipped in the "soil" tank continue on the overhead conveyor into an infrared oven which bakes the "soil" on the parts. Then they enter the large conveyorized degreaser shown at the left of the oven.*

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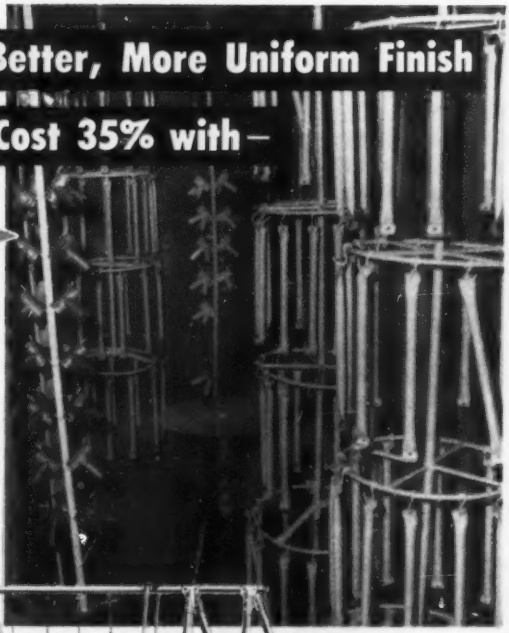

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***"Leveled copper is expected to effect substantial savings in cost and improve the corrosion resistance of the plated parts."***

The copper plates preferentially in the valleys of the polish marks, with the net result that the plated surface is smoother. This, in effect, accomplishes the same end result as buffing and eliminates other steps such as unracking, re-racking and cleaning which are necessary as a result of buffing. Furthermore, no copper is removed and the plated parts show better protection against rusting.

Figure 2 shows Chevrolet bumper guards being copper plated in the Du Pont lab's 300-gallon unit. The electrolyte consists essentially of copper cyanide dissolved in sodium and potassium cyanides. The leveling is accomplished by a combination of three factors:

1. A small amount of a special additive is used in the bath.
2. The bath is vigorously agitated.
3. Copper is plated on the parts for about 60 seconds, and then the current is reversed for 20 seconds to dissolve some of the copper. This cycle is repeated about 20 times during the 30-minute time cycle required to plate the copper.

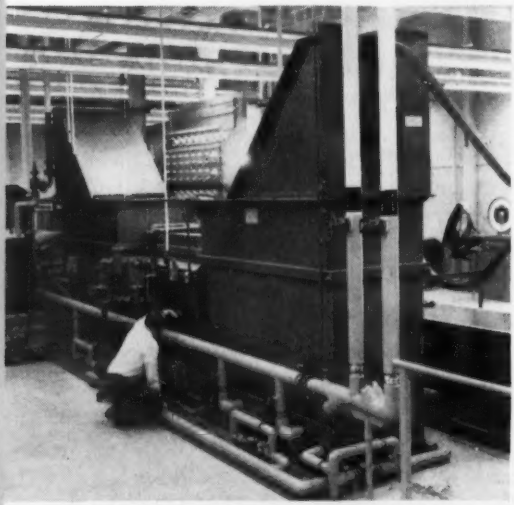

*Fig. 5—Large conveyorized degreaser processes metal soiled with lubricants and dirt and delivers metal that is clean, dry, and ready for subsequent processing steps. Machine's cycle is vapor — immersion — vapor. Solvent used is Du Pont's "Triclene" D trichlorethylene. (Photos courtesy Electrochemicals Dept., E. I. du Pont de Nemours & Co. (Inc.)*

The leveled copper plating process has been under development during the past seven years and trials are now under way in two automotive plants to evaluate commercial utility of the process. Leveled copper is expected to effect substantial savings in cost and improve the corrosion resistance of the plated parts.

**Chlorine Products Developments**

The principal uses of the products in this section are as cleaning solvents. These chlorohydrocarbon solvents are nonflammable and have supplanted the flammable solvents in many areas.

One major outlet for these solvents is in the field of industrial metal cleaning.

Parts on the conveyor shown in Figs. 3, 4, are contaminated with heavy oil and grease, plus a liberal application of insoluble soil such as shop dirt. These rather large parts of assorted shapes are being clean-

ed by one of the most modern methods of cleaning. The unit shown in Fig. 5 is a vapor degreaser and the solvent within is Du Pont "Triclene" D trichlorethylene —a nonflammable chlorohydrocarbon solvent especially developed for metal degreasing. In addition to the solvent action of the "Triclene" D on the soil, there are fixed solvent sprays in the degreaser. These sprays are one of several ways to obtain mechanical action.

**Trichlorethylene in Phosphatizing and Painting**

The most recent development activity in this process is to broaden the use of the nonflammable solvent trichlorethylene to the fields of painting and phosphatizing metals. These two processes using trichlorethylene are still, for the most part, in the development stage although there are several units in operation using trichlorethylene as the paint thinner to replace the commonly used flammable solvents. The trichlorethylene paint process not only uses "tri" as the paint thinner, but involves painting under a trichlorethylene vapor "blanket."

An active development program is in progress which will involve a phosphatizing unit somewhat similar in design to a vapor degreaser. This unit will apply a paint-bond finish to the metal from an essentially anhydrous system. Surface treatment of metals by phosphatizing is necessary not so much as a rust proofing treatment but to bond the paint to the metal. By integration of these stages this experimental process would clean (vapor degrease), phosphatize and paint within a single unit, with a completely nonflammable system and with no intermediate drying stages. Although trichlorethylene is usually used for degreasing, either methylene chloride or perchlorethylene is used for special applications.

**Vinyl Products Developments**

This part of the Elchem Sales Technical Laboratory is concerned with sales service and application research on vinyl products. A good portion of its time is spent in finding better ways to stick a material to other substrates or to itself.

At present Elchem offers a line of six polyvinyl acetate emulsions including two new products: "Elvacet" 1400, a small particle size homopolymer emulsion; and "Elvacet" 1423, an internally plasticized copolymer emulsion developed especially for use in paint applications.

The "Elvacet" emulsions are water dispersions of polyvinyl acetate. They form strong, durable films on drying, often, for safety reasons, replace solutions of resins in flammable solvents in various uses. Besides their good film forming properties, the "Elvacet" emulsions are characterized by their excellent adhesive and binding power.

A growing outlet for "Elvacet" emulsions is in paint applications. The emulsions are used both as the sealer or prime coat as well as the top or decorative coat.

Two new emulsions have recently been developed for use in paints. These emulsions, "Elvacet" 1423 and 1440, will be produced in a new plant at Toledo, Ohio with commercial quantities being available late this year.

# The Art of Color Matching

***Four sciences play a major part in color perception. Mr. Holle discusses in a general way how each of them can affect the colors seen by a color matcher.***

By JOHN C. HOLLE
Interchemical Corporation

**Several years ago,** if one had asked how long it took to train a good industrial color matcher, the answer probably would have been somewhere around ten years. Today this training is being accomplished in six months to a year. How is it being done? First, and most important, through the selection of only those who have excellent ability to see fine color differences; second, giving the selected men a good working knowledge of the basic tool of their trade—color; third, factory matching experience under a competent color matcher.

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Most of the material in this article is essentially that which is given to the neophyte color matcher in tutoring sessions held one hour each week for fifty-two weeks. It is slanted primarily toward the man who has had at best a high school education which includes a course in physics. It is written, hitting only the high spots, in sufficient technical detail to give basic information with sound scientific background to most of the factual data. In those areas which are still, in part, debatable, such as the physiological and psychological, the generally accepted hypotheses are presented without argument. Some of the material included should be of interest to those more experienced in color.

In the not too distant past almost all occupations were considered an art or craft. Today, in the midst of

the dizzying complication of automation, electronic gadgets, giant machines, mass production, and other symbols of our industrial progress, one is hard put to find a true master artisan.

Webster defines art as the systematic application of knowledge or skill in effecting a desired result; also, an occupation requiring such knowledge or skill. A commonly accepted industrial definition is that an art is an occupation which has not as yet been mastered by a machine. In our own industry, the old varnish cooker who alone knew all the secrets of varnish making is slowly being squeezed aside by automatically controlled set-kettles.

One art which is only gradually giving way to the refractors, electron tubes, mirrors, and integrators of the modern laboratory is color matching. In the making of inks and industrial paints, one of the final operations is adjusting the color—adding the right amount of the right pigment to bring the batch to the customer's specification. This is a real bottleneck to the production scheduler as no one can predict whether it will take one hour or one week to get the batch in under the wire. This is true even in cases where the particular formula has been successfully produced many times. The important function of consistently producing just the right color that helps sell automobiles, advertising, kitchen and home appliances, furniture, groceries, cosmetics, beer, and even thumb tacks is, for the major part, in the province of the *judgment* of a mere man called a color matcher. Of course, much work has been done in the development of instruments to measure color, color deficiency, and so on, but instrumentation requires the use of knowledge and techniques not generally available in industry.

So far no one has come up with a simple device to tell us how much of what must be added to a batch of ink or paint to give a visible match under normal, varying conditions of application and light. Instrumentation, of course, has its uses in the measurement of tristimulus values, and for maintaining graphical standards which may help the color matcher make decisions.

## What Is Color?

Color cannot be defined easily in terms acceptable to all who work with it or who are influenced by it in their day-to-day environment. Rigidly, color can be expressed numerically in terms of its tristimulus values and shown on a chroma-

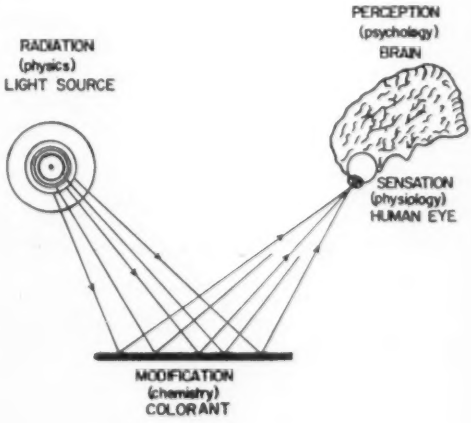



*Fig. 1. Color vision involves four sciences: radiation from a light source (physics) is reflected by a colorant (chemistry), producing sensation in the eye (physiology); final stage: perception in the brain (psychology).*

ticity diagram, each color having its own coordinates and its own position on the diagram. To most of us, color is something we "see."

"Seeing" color is astonishingly complex. Four major sciences play a part in modifying the color one sees. These are physics, chemistry, physiology, and psychology. Figure 1 shows in a simple way the significant effect of each science.

### Physics of Color

Color is light, and light is visible radiant energy, its spectrum being within the range of 400 to 700 millimicrons. Figure 2 shows schematically what happens when white light passes through a prism; the limits of the visible spectrum and the wavelengths of the colors are indicated in this illustration.

When light strikes any object, some of the radiation is reflected, some is absorbed, and some transmitted. We see things because light is reflected from them to the eye. The size, shape, and color of objects are determined by the particular pattern that is reflected.

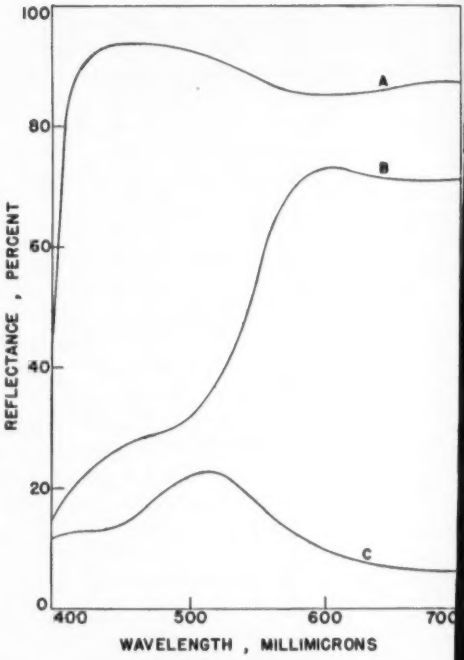



*Fig. 3. Spectrophotometric curves of three colors are shown here: a blue tint (A), an iron oxide red tint (B), and a dark blue (C).*

The color reflected by an object

*Fig. 2. A prism separates white light into its components. This is due to the fact that the velocity of light through transparent media depends on its wavelength.*

depends both on its pigmentation and on the nature of the incident light. Light can only be reflected in those portions of the spectrum which are present in the illuminating source. For example, a sodium light radiates no energy except in the yellow portion of the spectrum. Under this light, vari-colored objects which under normal light show up as red, blue, yellow, purple, and so on, all appear quite unnatural and dead, with a dull grayish yellow color.

Day to day and season to season variations affect the relative position of sun and eye. Longitude and latitude differences have an effect on the quality of light. White light passes through a constantly varying medium of clouds, dust, and polluted air in its path from the sun to the eye. Indirect illumination reflected from buildings, trees, and surrounding environment further influences the quality of light.

Because of these and other variables, constant light sources have been devised. For general industrial applications, color matching lamps, such as the Macbeth, are used which approximate certain specific natural light conditions. The color matcher may have these light sources available to aid him in his work. It cannot be said, however, that they solve the light problem for him. No lamp has yet been developed that will make possible a match that is always consistent in all respects—with other observers, under other light sources, or with different colorants. A color appearing to be a good match under one light may not look so good in daylight or to another observer.

The spectrophotometer has been developed as a means of making a permanent graphic record of a color. It consists of a light source, two dispersing prisms to isolate the various wavelengths, a lens system to channel the light, and a photoelectric cell to indicate the amount of light reflected or transmitted by a sample. Measurements are made throughout the range of 400 to 700 millimicrons (the visible spectrum). The percentage of light reflected as

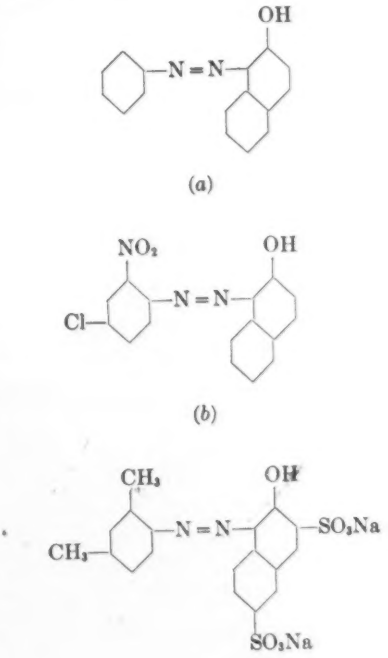



*Fig. 4. The color of a chemical compound depends on its structure. As the molecular weight of the compound and the number of substituents increase, the color changes from yellow (a) to orange (b) to deep red (c).*

compared with the standard is plotted against the wavelength at which the measurement was made. A smooth curve is drawn which defines the color of the sample as distinct from all other colors. Figure 3 shows examples of several of these curves.

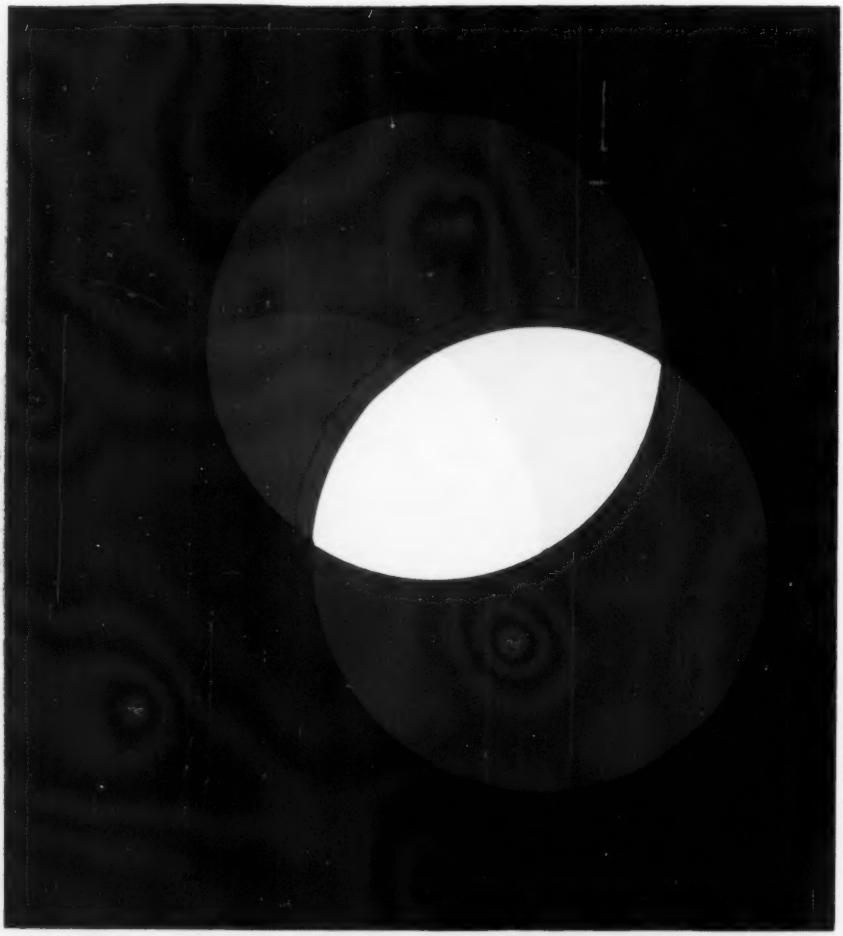


*Fig. 5. When blue light and green light are mixed, the color blue-green or cyan is observed. When green light and red light are mixed, the color yellow is observed. When blue light and red light are mixed, the color magenta is observed. When all three—blue, green, and red lights—are mixed, white is observed. A complete absence of light produces black.*

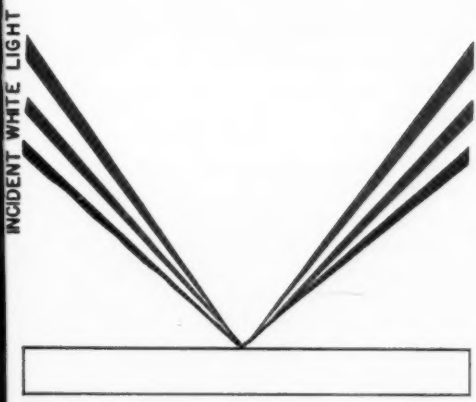


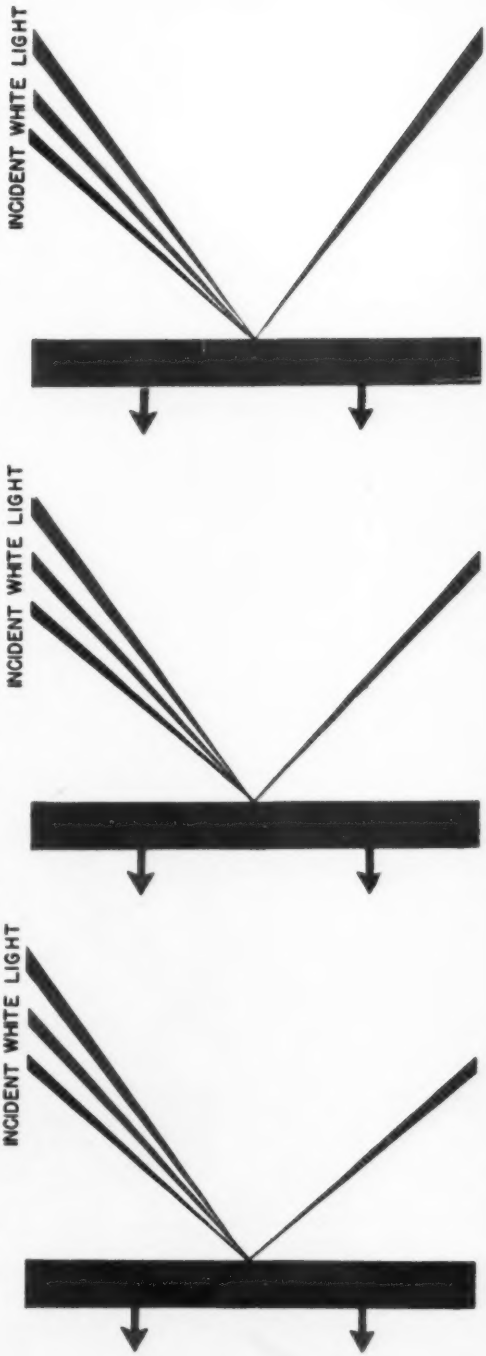

*Fig. 6. A white colorant absorbs none of the red, green, and blue bands of white light. These three components are therefore reflected.*

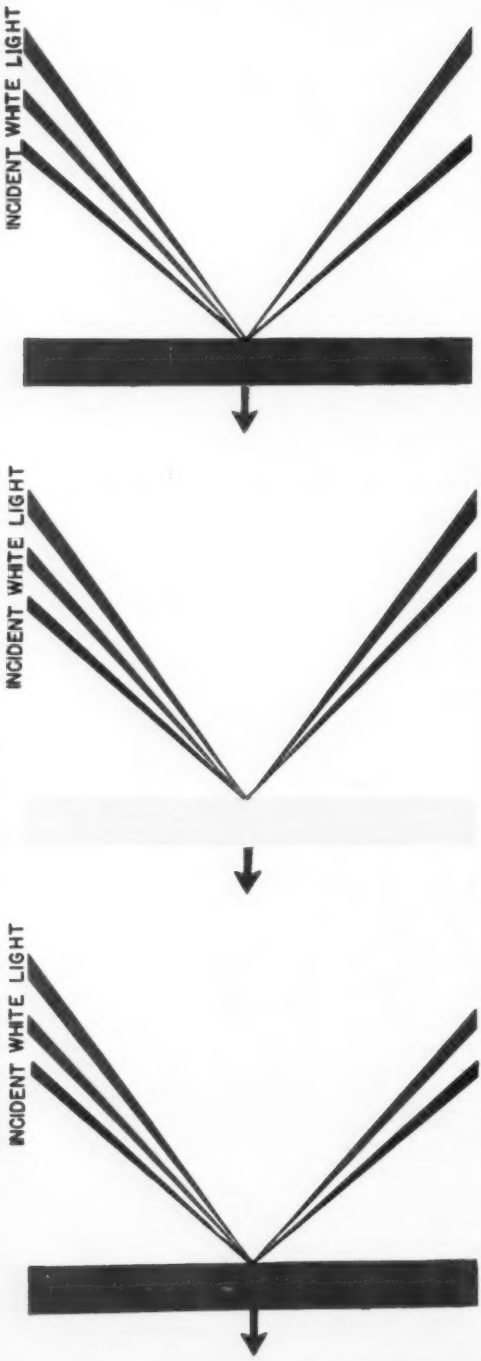
## Chemistry of Color

The percentage of light reflected for each wavelength of the visible spectrum depends upon the chemical composition of the reflecting surface and not upon the quantity of the incident light. The angle of incidence is another problem for the color matcher.

Nature parades for us many examples of color changes due to chemical change. The fewer hours of sunlight and cooler weather of autumn set up chemical changes which cause the leaves to turn from green to a wide panorama of color. The plumage of some birds changes with the seasons. The body chemistry of the chameleon causes it to present a reflecting surface which is affected by the mood of the animal or the surrounding conditions. The

*Figs. 7-9. A colorant that selectively absorbs two bands (represented by arrows) reflects only the third. This is shown (right) for red, green, and blue respectively.*——→






presence of different chemicals in flowers gives us many colors even in the same species. In fact, some of the first colorants were made of berries, leaves, and roots.

The chemicals, organic and inorganic, that are used today as colorants have one property in common: they all selectively absorb light. G. N. Lewis, in a definitive paper on the electron theory published in 1916 *(4)*, gives the conditions under which electrons vibrate and shows that when the electrons vibrate at frequencies higher than those of visible light, only the ultraviolet is absorbed. He further shows that by changing the molecule slightly, the frequency of the electron can be reduced to the point where it may begin to absorb visible light of the highest frequency, giving the color yellow. As the changes in the molecule become more pronounced, the frequency of the electron or electrons is still further lowered, and the lower frequency light waves are absorbed and other colors are produced. Figure 4 shows examples where slight changes in the structure of the molecule give different colors.

**Behavior of Light and Colorant**

In examining any particular color it would be quite impractical to consider each wavelength of the visible spectrum and follow its path to the eye. However, a good deal of

***Figs. 10-12. If a colorant absorbs only one color, it will reflect a blend of the other two colors. This is illustrated (left) for magenta, yellow, and cyan colorants respectively.***

insight can be gained by dividing the visible spectrum into three approximately equal bands—*R* (red), *G* (green), and *B* (blue). White light may then be considered as a mixture of these three "primary" colors in approximately equal amounts (Figure 5). Since a colorant (pigment) cannot *add* anything to the light with which it is illuminated but achieves its color by virtue of the light it *absorbs*, analysis is facilitated if stress is placed upon the absorption characteristics of the colorants.

A white colorant, therefore, absorbs virtually none of the light incident upon it and hence reflects the red, green, and blue components of the white light fully, as shown schematically in Figure 6.

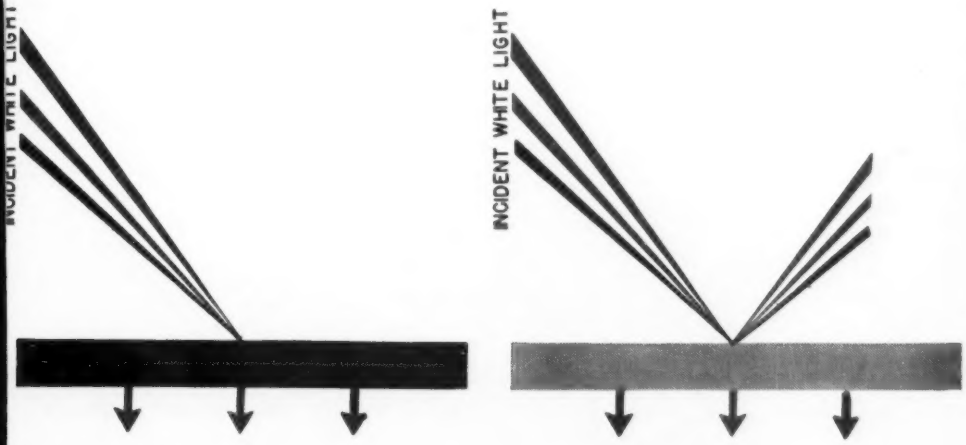
If two of the bands, for example blue and green, are selectively absorbed, only red is reflected. This condition is effected by a red colorant, as can be seen in Figure 7.

Similarly, a green colorant will absorb the red and blue, and a blue colorant, the red and green (Figures 8 and 9).

If the colorant absorbs only one of the three components, the resulting color is a blend of the two remaining ones, as shown in Figures 10 to 12.

These three colorants, each of which absorbs one of the primaries, are often considered the "pigment primaries," and are frequently mistakenly referred to as red, yellow, and blue, instead of as magenta (minus green), yellow (minus blue), and blue-green or cyan (minus red).

This confusion in terminology, which arises from deficiencies in the characteristics of the available magenta and blue-green colorants, has caused much misunderstanding and has led to the common misconcep-



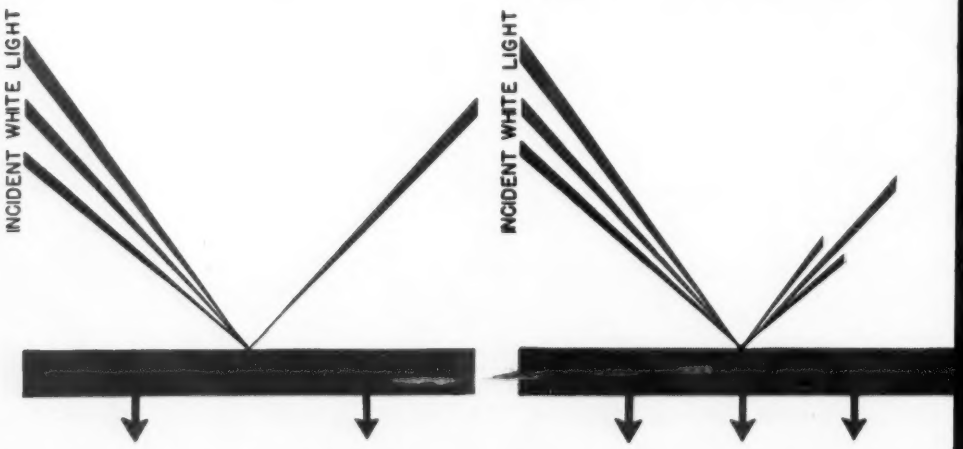

*Figs. 13 and 14. If a colorant absorbs all colors completely and reflects none, it will appear black. Incomplete absorption of all colors in equal proportions produces various grays, which become lighter as the per cent of absorption of the colors decreases.*

tion that the so-called "light primaries" are different from the pigment primaries, whereas it is obvious from the above that there is no real difference and that the pigment primaries in fact control the light primaries by absorbing them selectively from the incident illumination in which they are all present.

If all of the color were absorbed and none reflected, absolute black would result (Fig. 13). An absolutely black surface, if one could be obtained, would be invisible, although it could be discerned by contrast with its background. The best black colorant obtainable reflects something less than 5 per cent of the incident light. Absorption of all colors in the spectrum in equal proportions produces various grays, which become lighter in shade as the per cent absorption decreases (Figure 14).

A very significant point should be noted here. Color matchers strive for clean reds, yellows, and so on, but are usually confronted with dirty, muddy, or gray shades of the color. As explained above, black and the grays are produced when equal proportions of the three primaries of the visible spectrum — red, green and blue—are absorbed. Therefore, the cleanest colors are obtained when at least one of the primaries is totally reflected and the others absorbed.

For example, the cleanest possible green would result if a mixture absorbed the red and blue components completely and reflected all of the green component (Fig. 15). By the same token a light, dirty green would result if the mixture, in addition to reflecting almost all of the green component, reflected also some red




*Figs. 15 and 16. Cleanest possible green is obtained when colorant absorbs red and blue completely and reflects all of the green (left). If it absorbs red and blue incompletely and reflects only part of green component, a dirtier, darker shade of green results (right).*

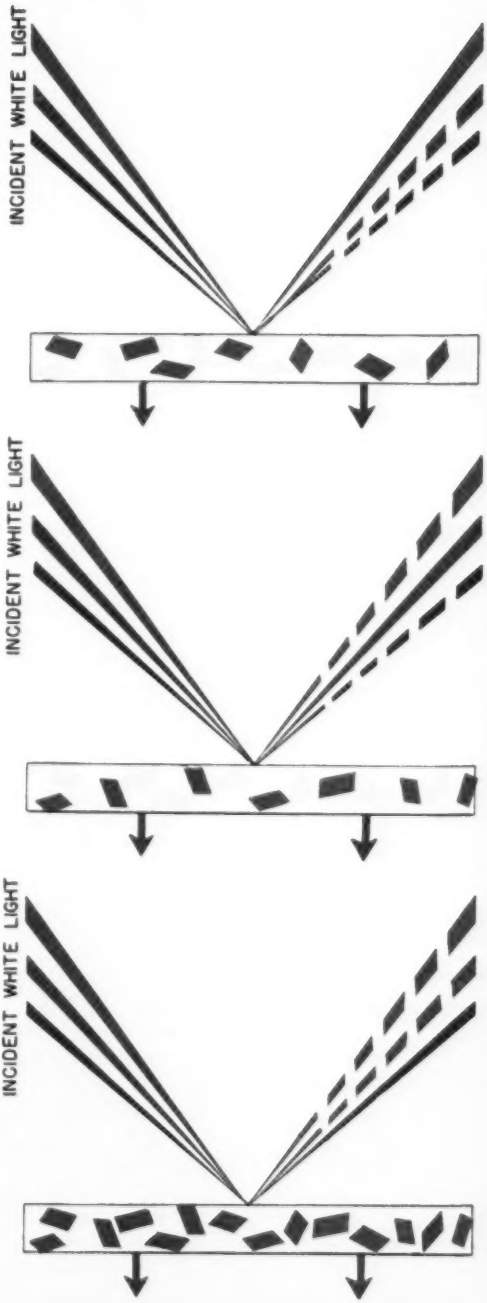
and blue. If the mixture absorbs all the red and blue and only reflects part of the green component, a darker shade of green is obtained. If this dark shade reflects small amounts of red and blue, it will be less pure (Fig. 16).

In any instance where the colorant or colorant mixture absorbs any significant percentage of *all three* components, a gray, dirty, or muddy shade results, irrespective of the color.

To summarize:

Green and Blue absorbed, Red reflected = red
Blue and Red absorbed, Green reflected = green
Red and Green absorbed, Blue reflected = blue
Green absorbed, Blue and Red reflected = magenta
Blue absorbed, Red and Green reflected = yellow
Red absorbed, Blue and Green reflected = cyan
Red, Green, and Blue absorbed, nothing reflected = black
Nothing absorbed, Red, Green, and Blue reflected = white
Red, Green, and Blue absorbed and reflected in the same proportion of each = gray or shade.

Let us now take a look at some of the mixtures of primary pigments that the color matcher puts together and examine them in terms of light. When a color matcher mixes




***Figs. 17-19. How colors are produced by mixing pigments is shown (right) for red, green, and blue. The solid traces represent the color reflected by the mixture, the broken traces those that are absorbed.***

pigments, he produces a subtractive mixture; each of the pigment components continues to subtract from the original light source by absorbing its characteristic wavelength. This should be distinguished from the use of spotlights in stage presentations (Figure 5) where energies are being added to produce colors (additive mixture).

Red is produced by mixing magenta and yellow pigments (Figure 17). One broken trace indicates the blue that would be reflected if the yellow pigment were not present. The yellow pigment absorbs this blue; similarly, the other broken trace indicates the green that would be reflected if the magenta pigment were not present. Note that the red produced is a clean red because two of the three primaries have been completely absorbed, and the third completely reflected.

Green is the result of mixing blue-green and yellow pigments (Figure 18). The one broken trace indicates the blue that would be reflected if the yellow pigment were not present. The yellow pigment absorbs this blue; similarly, the other broken trace indicates the red that would be reflected if the blue pigment were not present. Note that the green produced is a clean green —red and blue are completely absorbed, only green is reflected.

Blue is produced by mixing magenta and blue-green pigments (Figure 19). Again, one broken trace indicates the red that would be reflected if the blue-green pigment were not present. The blue-green pigment absorbs this red; similarly, the other broken trace represents the green that would be reflected if the magenta pigment were not present. Note that the blue produced is a clean blue, because red and green are absorbed and only blue is reflected.

The above discussion has, for simplicity, divided the spectrum into three equal bands and assumed that each of these bands is of a uniform color. A glance at the spectrum shows, however, that this is not the case, and that the hue shifts gradually and continuously as we go from one end of the spectrum to the other. Therefore a colorant which absorbs "blue," for instance, can vary from a greenish yellow to an orange, depending upon the width of the blue region in the spectrum absorbed by it.

Similarly, a magenta can vary from almost a red to a purple, depending upon the location in the spectrum of the "green" that is absorbed. In addition, normal colorants produced for industry by the pigment or dye suppliers do not, in general, absorb completely only one or two bands in the spectrum, nor do they reflect the remainder 100 per cent. Pure red, oranges, and yellows come the closest to the idealized picture sketched above, but almost all of the other colors absorb to a greater or lesser degree even in those areas where maximum reflectance is desired.

For example, in the discussion pertaining to "magenta" it was assumed that colorants were obtainable which absorb only the green, reflecting completely in the blue and red region. In actuality no such

materials are available, and the closest approach to the idealized magenta absorbs quite strongly in the blue as well as in the green, and therefore appears very much redder than the above analysis would seem to indicate. Figures 20 to 22 show spectrophotometric curves for some of the purest obtainable pigment colors, phthalocyanine blue, sodium lithol red, and hansa yellow. These curves indicate the extent to which various regions of the spectrum are absorbed to yield the color which is thus produced.

**Physiology of Color**

Color is a personal sensation and results from the amount of stimulation of the eye by different parts of the spectrum, or by mixtures of different parts of the spectrum. The eye, then, is the third step in the process of "seeing" color.

The really important working parts of any sense organ are the receptors. The image formed by the eye's optical system falls on an exceedingly complex structure of nerve endings called the retina. The nerve endings are not all of the same type and they are not evenly distributed over the retina. Near the center of the retina is the fovea, an area about 0.5 millimeter across. Here some 34,000 nerve endings are concentrated, which are called the cones; each of these has a separate nerve which is believed to be connected to both halves of the brain.

When looking at any object, only that part of the image which falls on the fovea is seen distinctly. The density of cones over the balance of the retina area decreases as the distance from the fovea increases. Interspersed over the retina, except in the fovea area, are the rods. While the cones are primarily color sensitive, the rods are primarily brightness sensitive, without regard to color. There are some 130 million nerve endings or cells on the retina, but there are only about one million nerve fibers connecting the retina to the brain. A logical conclusion, then, is that much of the information gleaned by the retina is pooled by the time it reaches the optic nerve system.

The most generally accepted theory of how the cells preferentially send impulses along the nerve fibers is that each receptor cell contains

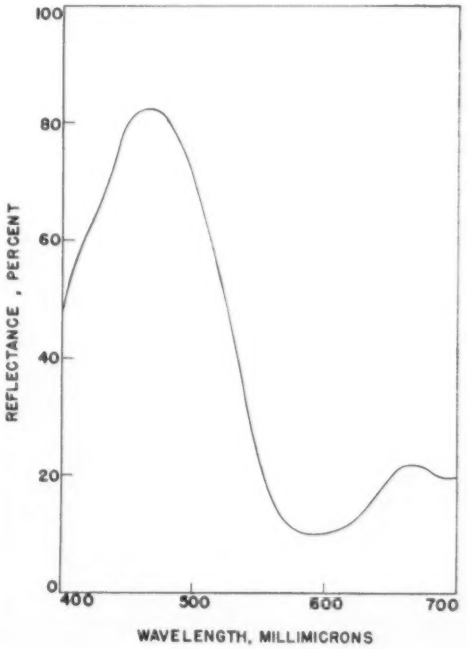



*Fig. 20. Spectrophotometric curve of phthalocyanine blue pigment, one of the purest blue colors that can be obtained.*

photosensitive pigments which set up at least three color-determining paths. Those cells strongly sensitive to yellow and green are cones, and those strongly sensitive to violet are rods.

The color sensations produced, however, are not the same as the response, nor are they directly dependent upon it but upon the differences between the responses from the receptors. It is probable that white is sensed when there are no differences between the frequencies of impulses along the different color-determining paths; in other words, when all the receptors are responding equally. Some forms of color blindness are caused by malfunctioning of one or more of the three color-determining paths.

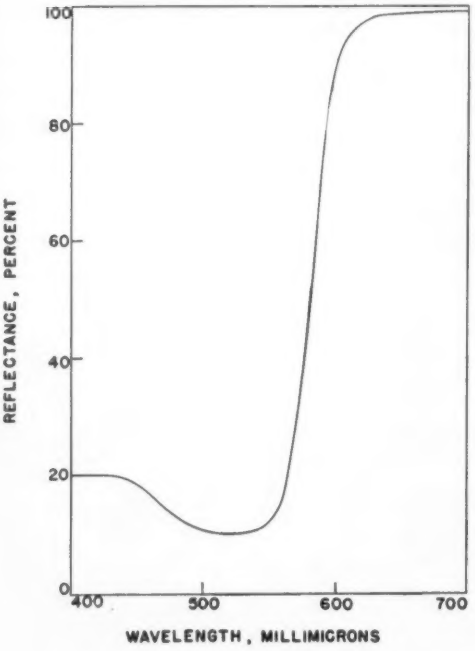



*Fig. 21. Spectrophotometric curve of a very pure red pigment, sodium lithol red.*

In the fovea area is found a heavy deposit of coloring matter known as the yellow macular pigment. It varies in thickness with individuals and its purpose is to filter out some of the blue light which would otherwise reach the cone ends. Considerable differences in color vision between individuals are due to just this one cause.

One of the most important factors which determine the actual sensation of a particular color is the state of adaptation of the eye. Like all sense organs, the eyes do not respond continuously, but adapt to a constant stimulus. The frequency of the receptor, in general, decreases with increased duration of the stimulus. If the intensity of light is suddenly increased, the eye adapts itself to the new level in a matter of seconds, but if the stimulus is suddenly decreased, it might take the eye half an hour to adapt. The rate of adaptation and the rate of recovery from adaptation are not the same for the three receptors.

The blue receptors react more slowly than the green and yellow. If one looks steadily at a red surface, the red receptors and, to some extent, the green, which are affected by the red light, adapt to the red stimulus and become relatively insensitive while the blue receptors, being almost unstimulated, may even gain in sensitivity. If, under these conditions, one now looks at a white wall, it will appear bluish green in color. All these receptors should react

equally to give white, but because of adaptation blue receptors are too sensitive, and red receptors too insensitive. The resultant impulse gives a bluish green sensation.

**Psychology of Color**

There is no clear-cut line between sensation due to the eye mechanism and perception due to the mental process. However, the over-all physical reaction, glandular or muscular, caused by the sensation is sufficiently unique to warrant consideration as a purely mental phenomenon. Here are only a few of the more startling effects which confront those who work with color.

The motivation or reason for looking at colors has much bearing on what one "sees," and what one "sees" when looking at colors can cause a physical or emotional reaction. To complicate the picture, one's color environment through life has a tendency to modify what is "seen" or how one feels or reacts. An experienced color matcher, being pushed to finish a difficult match, can easily convince himself that he has an acceptable match, and the inspector who has final responsibility can easily find fault with a match that is really quite within acceptable tolerance.

The quality of food can be judged acceptable or not acceptable solely on its appearance. Many individuals convince themselves that white margarine has an off taste. Meat is bad because it is not quite red enough, and who could eat purple mashed potatoes?

Colors can make a major appeal to the emotions. They can be warm (orange) or cool (green); exciting (red) or soothing (light, clean blue); cheerful (yellow) or depressing (dull, dirty blue); light colors are enlarging and dark colors confining. Bright primary colors appeal to children but as one grows older the shades and subtle tones have more of an appeal. People "see red" or "feel blue." Red signifies danger, and green, safety. Architecture, interior decorating, industry, advertising, are examples of fields that recognize the psychological influence of color.

The apparent color of any object depends on the color of its surroundings. A blue object viewed against a black background appears lighter in color and less intense or saturated than when viewed against

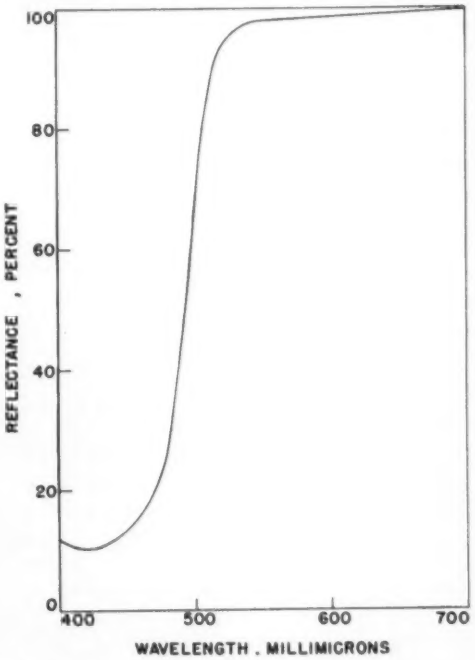



*Fig. 22. Spectrophotometric curve of hansa yellow, a very pure yellow pigment.*

a white background (Figure 23). The color will also appear more saturated and intense the more it differs in hue from its background, i.e., the more nearly the background corresponds to the color's complement. This can be explained by lateral adaptation of the eye.

Conversely, the apparent color of a pattern depends partly on the colors of the adjacent areas. If black lines are printed around the reds and blues of a design, the colors appear darker and more saturated than when they are surrounded by white lines. There is no adequate explanation for this phenomenon, known as the "spreading effect."

**The Color Matcher**

We now come to the color matcher whose job it is to match an ink or paint visually to one of the more than ten million different colors that it is possible to recognize consciously.

Anyone with normal color vision is able to judge colors that are wide apart, and is even capable of reading color difference "close" to the match. However, the skilled color matcher operates within the limits from a close match to one that is considered acceptable. Here we are confronted with a judgment variable, and it is not a simple judgment. The number of times a person can change his mind in making just one color match is an indication of how difficult and unstable such a judgment is. At first the problem is easy; the colors of the batch and standard are wide apart, but as more and more of the toning pigment is added to a batch, the differences become more difficult to detect. In the final stage, the color matcher comes to a point where he cannot judge significant difference, and he calls it a match.

It is difficult to obtain a perfect visual match. If a sample of paint is sprayed on two identical pieces of metal in one operation, and the panels are cured together under identical conditions and then compared, the two panels will appear different — very, very close, to be sure, but still different. Now considering all the variables of the light source, pigments, and so on, it is obvious that there will always be a difference.

Practical considerations, therefore, demand that some sort of tolerance limits be set up to aid in the final judgment. In times past, when the only light source was daylight, and colorants few in number and of questionable color consistency, customers tolerated pretty much what they were able to get. Today, with uniform light sources, a wider selection and improved control of colorants, and consumer demands for smaller differences, the color matcher is left with very little tolerance. The term "commercial match" has often been misused in justifying a match within tolerance, but since the phrase has never been satisfactorily defined it is best not to use it. The skill of the color matcher, together with his experience and knowledge of the particular customer's demands, are the usual criteria of practical tolerance.

In judging differences, there are certain factors which have a more influential bearing on the match

than others. These could have been discussed under physics, psychology, and so on, but are presented here for greater emphasis.

Two colorants may have the same spectrophotometric curve but appear different visually, due to any of the following causes:

### 1. Effect of Surface or Substrate

The same dye used on a wool sweater and a closely woven piece of wool fabric will produce different visual colors. Paint applied over paper, wood, and metal does not appear to be the same color. The texture of the surface, opacity, film thickness, rubbing or polishing, all contribute to visual color differences. The color matcher can eliminate many of these variables by using uniform film thickness, hiding, curing, checking samples for absorption into substrate, surface wear, floating, and so on.

### 2. Effect of Gloss

The higher the gloss, the more the reflecting surface appears to act as a mirror, with the result that a large portion of incident light can be reflected in such a way that it does not reach the eye. If the eye is at just the right angle, then a large portion of the light is reflected directly to the eye with a lesser amount of the diffused light from the colored surface. If two samples are being compared and the gloss is not equal on each, it is impossible to have a visual color match over all of the angles of viewing. Consumer specifications today usually require a gloss tolerance, and the experienced color matcher will correct for gloss before he makes final color adjustment.

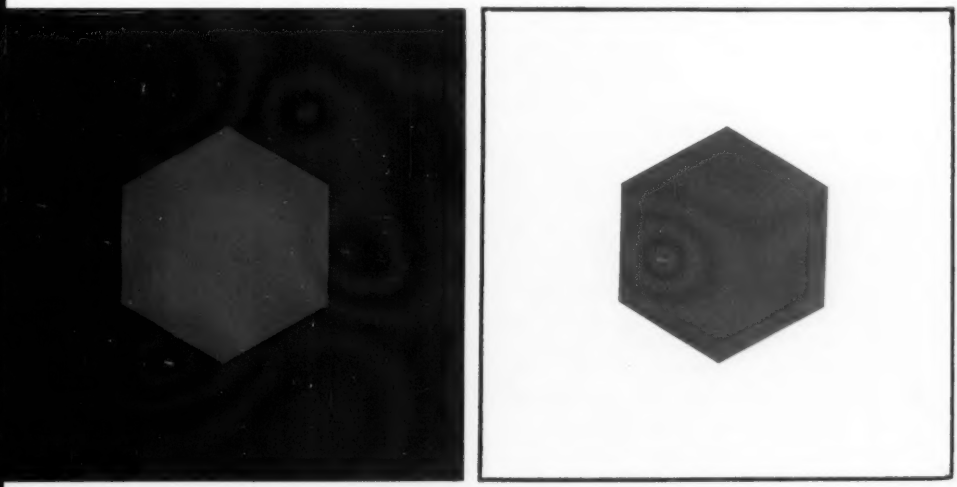


*Fig. 23. The apparent color of any object depends on the color of its surroundings. Although the two hexagons above are of precisely the same color, the one on the left side appears lighter in color and less saturated than on the right because of the background. (Illustrations courtesy Interchemical Corporation, New York 36, New York)*

### 3. Effects of Multiple Layers and Angle of Viewing

In the ink and paint industry, a large percentage of the color problem is made more complicated by multiple layers of colorants. Typical systems consist of a ground coat, a top coat, and a finishing varnish; a ground coat, ink, and a finishing varnish; and, in lithography, several transparent inks over a ground coat, followed by a top coat. Under these conditions, surface gloss due to the varnish, combinations of light transmission, refraction, and reflection, mass tones of the primers, undertones and mass tones of the inks, all interact to give a different appearance for every angle of view.

Three critical angles are: (*a*) the position of maximum transmission of light through the colorant film and reflection from the substrate, back through the colorant film to the eye; (*b*) the position of maximum surface reflection or gloss; and (*c*) the position of least reflection on looking across the surface with the eye at the edge.

The color matcher must base his judgment on the overall appearance over a wide range of angles. He should make his observations first with the specimens held perpendicular to the eye, and then quickly check the color through angles in both directions from the perpendicular. It is a good idea, too, to recheck the judgment by reversing the positions of the specimens.

### 4. Effect of Size of Specimen

The larger the angle subtended by the reflecting surface, the more light is received from it; thus fine color differences can be perceived more readily. Observing color differences in small samples is very unreliable. The color matcher should have specimens at least fifteen square inches in area at arm's length in order to make a good judgment.

### 5. Effect of Eye Fatigue

After-image, or eye fatigue, represents another situation of which the color matcher must be mindful. The longer a person looks at colors of the same hue, the less will he be able to perceive fine color differences; and the more time a person spends in looking at the same set of specimens, the less will he be able to perceive fine differences between them. The color judgment should be made within the first few seconds of viewing. The color matcher should work on several hues during the day to avoid some of the effects of adaptation.

### 6. Effects of Emotions and Attitude of Observer

As in human relations, the solution of color problems by logic and reasoning is often beclouded by emotional factors. A person who is ill, fatigued, or, in particular, under emotional strain cannot make reliable color judgments. Furthermore, the color matcher must be entirely impartial, with no axe to grind except to shade the batch to what, in his best judgment, is an acceptable match.

### 7. Effect of Age

There is evidence that the effectiveness of some color matchers de-

creases with age. Investigators have discovered that many individuals, as they age, develop a yellow pigmentation in the lens and in the macular area. This would have the same effect as looking through a yellow filter, and would result in making blues look greener and purples redder. This condition in a color matcher is commonly known as "red eye," and causes him to be less sensitive in his perception of colors that are in the violet end of the spectrum.

Making the color judgment is only part of the color matcher's work. He must also decide how much of what pigment or pigment dispersion is to be added to the batch being toned. The more experience he has in toning production batches, the more proficient he becomes in selecting just the right pigments in the right amounts to bring about the desired color change. The hue, brightness, and saturation characteristics of each pigment must be a substantial part of his job knowledge, and are learned through study of the specifications of each pigment, and experience in working with each pigment.

There are few jobs which are so profoundly influenced by aptitude and experience as color matching. In order to reach an accurate judgment quickly, the delicate balancing of many factors is required; these include preparation of the specimens, light and viewing factors, psychological influences, and customer requirements. Only an individual with unique aptitude and special training can consistently make good color judgments.

**Selection of Color Matchers**

The most obvious attribute of a color matcher is that he should not be color blind. The Ishihara charts and American Optical Company Test are two of several tests which are widely used to eliminate those whose color vision is impaired through color blindness.

Next in importance is to select those individuals who are able to discern fine color differences. In recent years the Inter-Society Color Council has developed a test designed to distribute a population into groups of varying degrees of excellence in making color discriminations. Individuals are required to make forty fairly difficult color matches under standard conditions. Weighted scores are assigned for an exact match, one shade on either side of the correct match, and two shades on either side of the correct match. If a high qualification score is set for this test, the odds are significantly high that individuals attaining this high score have excellent or even superior color discrimination. In addition, the person selected for color matcher training should have at least average learning ability and judgment, coupled with an even temperament.

It has been obvious for some time that industrial color tolerances are becoming increasingly strict; so much so that visual color judgments, affected as they are by so many variables, are being questioned by some. This has led to the use of instruments, known as colorimeters, which are designed to measure and give numerical values to color differences. However, while the trend toward instrumentation

for industrial color matching is steadily increasing, its adoption is progressing slowly because of the lack of personnel trained in instrumental methods. It will take some time before the trained eye of the color matcher can be supplanted by an instrument.

*Acknowledgment:* The suggestions of F. L. Wurzburg, Jr., of the Commercial Research Department, and D. Smith of the Research Laboratories, Interchemical Corporation, are gratefully acknowledged.

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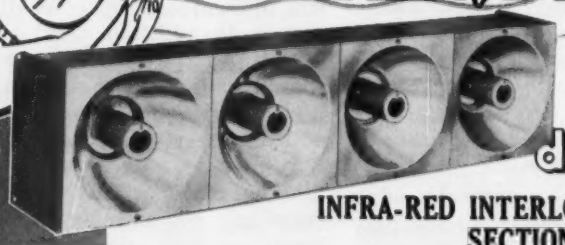

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SPOTLIGHTING

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# Recent Developments in Porcelain Enameling

Dr. Nelson F. Murphy

**The use of porcelain enamel** as a protective coating for many household and industrial products has long been firmly established. Probably its most valuable property is the impermeability of the coating. This property makes porcelain enamel valuable in those applications where contamination from radioactive fallout may be expected.

**Porcelain Enamel on Aluminum.** Application of porcelain enamel to aluminum requires that the frits have a low melting point. When aluminum panels are fired above 1050 deg. F. they lose their shape and strength. Frits which can be fired at 1000 deg. F. permit the building and appliance industry to take advantage of the light weight, the corrosion resistance and insulating properties of coated aluminum. Some of the products which have been developed are wall tile, refrigerator and stove panels, exterior wall panels, venetian blinds and even enameled cast-aluminum pots and pans.

One company has developed a method and machine for applying porcelain enamel to aluminum foil. Coated foil, available in colors and textures, has all the qualities of true glass coatings and is capable of being bent, dented, twisted, cut with scissors, drilled and punched without damage.

Porcelain enamel on aluminum tile has been competitive with all-porcelain tile only because years of research have been devoted to the development of a hard, resistant product.

Methods of spray coating enamels on aluminum for tile have been developed. A cooperative study involving the manufacturers and the spray-equipment suppliers resulted in a practical production-line method. Warp prevention required coating on both sides, in two booths. The thickness of the coating on the back was 0.002 inch, that on the face 0.003 inch. The tiles are sprayed flat, and are automatically turned over between coatings.

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| 6. Is it insoluble in aliphatic alcohols, glycol and glycerine? | ☐ | ☐ |
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| 8. Is it non-toxic in food and beverage service? | ☐ | ☐ |
| 9. Is it also supplied with T-ribbed back, for casting into place in new concrete tanks? | ☐ | ☐ |
| 10. Are expert applicators available in all major cities? | ☐ | ☐ |

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The entire operation — spotting the tiles, firing, and packaging — takes only 15 minutes.

Porcelain-on-aluminum panels for construction are spray coated on a conveyor line, from the cleaning and pretreating through the drying oven and furnace.

For these panels, alloys high in copper, zinc, manganese and magnesium should be avoided. The metallurgical properties of the alloys has resulted in selection of 1100 (2s), 3003 (3s), 6061 (61s) and 6063 (63s) alloys for enameling. All forming is done before enameling, although holes may be drilled or punched, and certain sawing or shearing operations may be performed after enameling. The raw edges are corrosion resistant and do not require treatment.

Cleaning is performed as follows: (1) clean in a chrome-inhibited, non-silicated, non-alkaline cleaner at 160 deg. F., pH 8.3, (2) water rinse at 180 deg. F., (3) etch in caustic soda at 140 deg. F., (4) rinse again in water at 180 deg. F., (5) de-smut at room temperature, (6) rinse in cold water, (7) chrome-conversion coat, (8) cold water rinse, and (9) dry at 190-200 deg. F.

The coating on architectural panels is thicker than on tile: from 0.003 to

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0.005 inch. The frit is dried at 160 deg. F., fired in a batch-type furnace for 5 minutes at 1000 deg. F. (7-9 minutes of furnace time).

These coatings are resistant to thermal shock and fire. They are available in several colors and surface textures.

Sometimes the enamel used on the backs of panels is made up of recovered overspray and booth scrapings. This is reground, thinned to proper consistency, and applied to obtain a 0.003-inch thickness of fired coating.

The base material for porcelain enameling may also be aluminum coated steel. The rigidity of the steel core helps to prevent warping.

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*Phosphating Treatments-Patent Literature Survey.* By E. C. Tinsley, Rock Island Arsenal Laboratory, U. S. Army Ordnance Corps. 148 pages. Order PB 131356 from O.T.S., U. S. Department of Commerce, Washington 25, D. C. Price, $3.75.

This volume was prepared as an aid to chemists and engineers concerned with production or selection of effective phosphate coatings. Data on 522 patents relating to phosphatizing.

# A Timely Message on

# "Launching Missiles of the Mind"

## by Ben P. Sax

Chairman of the Board, *American Buff Company*

Curiosity and enthusiasm create a potent "fuel" that fires man's imagination . . . launches "guided missles of the mind" that circle physical objects or mental images in areas as varied as men and their interests. In all ages, minds "orbiting" around individual problems and concepts have produced effective understanding and new solutions for concrete as well as intangible questions.

In the metal finishing industry, our own company has launched many a mental rocket. Visionary conceptions have been projected into practical accomplishment . . . unique tools and methods, which in turn help to provide many of the parts for mighty, mechanical rockets which launch actual missiles, as well as manufacturing economies to bring products within easier buying reach of the mass market.

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All of us today should concern ourselves with the spread of *more interesting* educational material, revealing to young men and women, *and* boys and girls, the exciting world which opens from every new avenue of an educated mind. The youth of today can become our greatest pool of future strength, if its appetite for higher education and scientific knowledge is properly whetted.

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# Training Courses in Finishing

***A list of training courses in electroplating and paint finishing to be given in various cities . . .***

## COURSES IN ELECTROPLATING

| City | School | Instructor | Tuition per Semester | Course Length |
|---|---|---|---|---|
| Brooklyn, New York | Ft. Greene Evening High School, 29 Fort Greene Pl. | Louis Serota, 4495 Kings Hghy., Brooklyn, N. Y. | None | 18 weeks |
| Chicago, Illinois | Illinois Institute of Technology, 3300 S. Federal | J. M. Andrus | $90.00 | 18 weeks |
| Detroit, Michigan | Mumford High School, 17525 Wyoming. Sponsored by Detroit Branch, A.E.S. | Date to be announced in January, 1959. Data available from E. L. Scholl, Chrysler Central Engineering, Dept. 811, 12800 Oakland Ave., Highland Park, Mich. | | |
| Evansville, Indiana | Kushner Electroplating School, 2509 Washington Ave. (Correspondence School) | Joseph B. Kushner | $150.00 (Group Discount) | 4 mos. to 1 year |
| Indianapolis, Indiana | Purdue University Extension, 902 N. Meridian St. | Dr. A. M. Max, 5640 Guilford Ave., Indianapolis, Ind. | $45.00 (Minimum enrollment of 15 persons required) | 16 weeks |
| Los Angeles, California | Woodbury College, 1027 Wilshire Blvd. | Mitchell Raskin, 3034 Greenfield Ave., Los Angeles | $35.00 | 18 weeks |
| New Haven, Connecticut | New Haven College, 51 Prospect Street. Sponsored by New Haven Branch, A.E.S. | E. F. Foley, Jr. 222 Augur St., Hamden, Conn. | $50.00 | 15 weeks |

| City | School | Instructor | Tuition per Semester | Course Length |
|---|---|---|---|---|
| Newark, New Jersey | Various Plants and Laboratories. Sponsored by Newark Branch, A.E.S. | F. J. LaManna, Bart Mfg. Corp., Belleville 9, N. J. | $20.00 | 10 weeks |
| Philadelphia, Pennsylvania | Temple University, 1808 Buttonwood Street. | Dr. Samuel Heiman, 5155 Westford Rd., Philadelphia, Pa. | $36.00 | 16 weeks |
| South Bend, Indiana | Sponsored by St. Joseph Valley Branch of A.E.S., with classes at Bendix Products Div., South Bend, Indiana | Dr. Harold J. Wiesner, Bendix Products Div., South Bend, Ind. | $12.00 for A.E.S. members, $18.00 for non-members. | 12 weeks |
| St. Louis, Missouri | O'Fallon Technical High School. Sponsored by St. Louis Branch, A.E.S. | Dr. Otto C. Klein, American Zinc, Lead & Smelting Co., P. O. Box 495, East St. Louis, Ill. | $9.00 | 16 weeks per semester, four semesters |

## COURSES IN SPRAY PAINTING

| City | School | Instructor |
|---|---|---|
| Amherst, Ohio | Nordson Corp., Amherst, Ohio. Contact R. T. Schafer, Assistant to the President. (Course in Airless Spray Painting) | Frank J. Ziroe |
| Chicago, Ill. | Binks Manufacturing Co., School of Spray Painting, 3118-40 Carroll Ave. | William R. Brooks |
| Houston, Texas, other cities | Spee-Flo Co., 6614 Harrisburg Blvd. Demonstrations of hot spray and hydrairless spray held in various cities. | |
| Toledo, Ohio | DeVilbiss Company School of Spray Finishing, 300 Phillips Ave. | I. B. Thomas |

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*Description:* A line of barrel finishing equipment designated the Model 30 Series, recently introduced by Techline Div. of Wheelabrator Corporation, operates with so little vibration that a coin balanced on edge on the housing will remain standing through an entire operating cycle, the manufacturer states.

*Specifications:* Molded fiberglass safety gate and housing; full-opening door on the cylinder, locked by a cam-operated handle that exerts high pressure on the neoprene seal with only half a turn; power transmission by V-belt drive; 20 models with five to 30 cubic feet capacities, one to six separate compartments.

Bulletin 200, available from the manufacturer, gives complete details.

*Manufacturer:* Techline Division, Wheelabrator Corp., 1155 Avenue V, Vicksburg, Mich.

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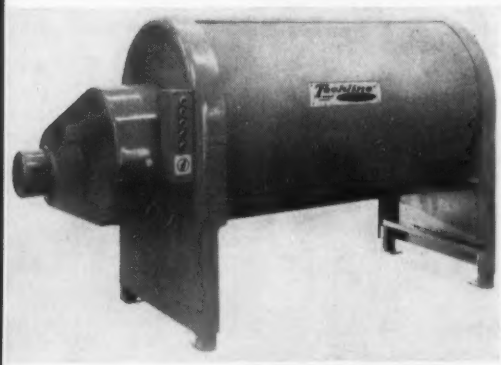


*Techline Model 30 Barrel Finishing Machine*

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## Desmutter for Aluminum

*Description:* Alkalume D.S., a product for desmutting aluminum, is designed to replace liquid acids, has longer life than sulfuric-chromic acid, will remove smut in same time required by liquid acids, the manufacturer states. Time required is approximately one-half the etching time.

This product is dry, dustless and free flowing. It produces no heat when added to water, requires no special equipment.

*Manufacturer:* Northwest Chemical Co., 9310 Roselawn Ave., Detroit 4, Michigan.

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## Conveyor Drive

*Description:* A variable-speed caterpillar drive recently introduced by Al-

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In addition to the multiple cluster illustrated, Udylite now offers 12, 8 and 4 barrel units for plating any number of small and medium sized parts. These cluster combinations are indispensable for anyone engaged in the production plating or processing of business machines, radios, electrical and electronic items.

If processing of small batches or volume plating *without mixing* is a problem in your shop contact your local Udylite salesman now. He can show you how Udylite Cluster Barrels can be *your* answer, too! Call him today or write direct to:

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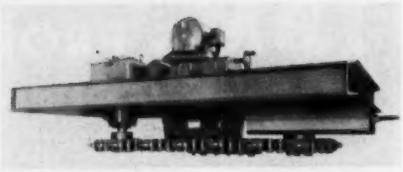
vey Ferguson Co. for its overhead trolley conveyors reduces headroom requirements by mounting the drive sprocket directly on the speed shaft of the vertical-type reducer, thus eliminating the bulky spur gear and pinion formerly used.

The drive is available in various combinations of horsepowers and speeds. Floating drives are furnished for installations where multiple drives are required. A-F also provides fluid drives for high inertia loads, as well as automatic overload cut-offs.



*A-F Variable-Speed Caterpillar Drive*

*Manufacturer:* Alvey-Ferguson Co., 626 Disney St., Cincinnati 9, Ohio.

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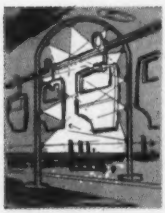

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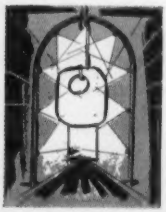

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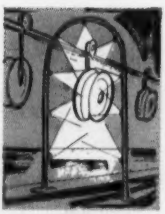

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*Manufacturer:* Stratford Chemical Co., Inc., Honey St., Milford, Conn.

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*To page 98→*

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D. Length of up and down stroke variable from 4" to 27"

E. Number of strokes variable from 32 to 70 per minute.

F. Tank shell is fabricated of solid heavy gauge hot rolled steel.

G. Available with immersion heating choice of steam - gas or electric.

H. The same air operated piston lowers, raises and agitates the rack.

Since 1923 **CIRCO EQUIPMENT COMPANY**

Write for New 4-page Brochure with Complete Information on All Models.

**51 TERMINAL AVE., CLARK, NEW JERSEY**

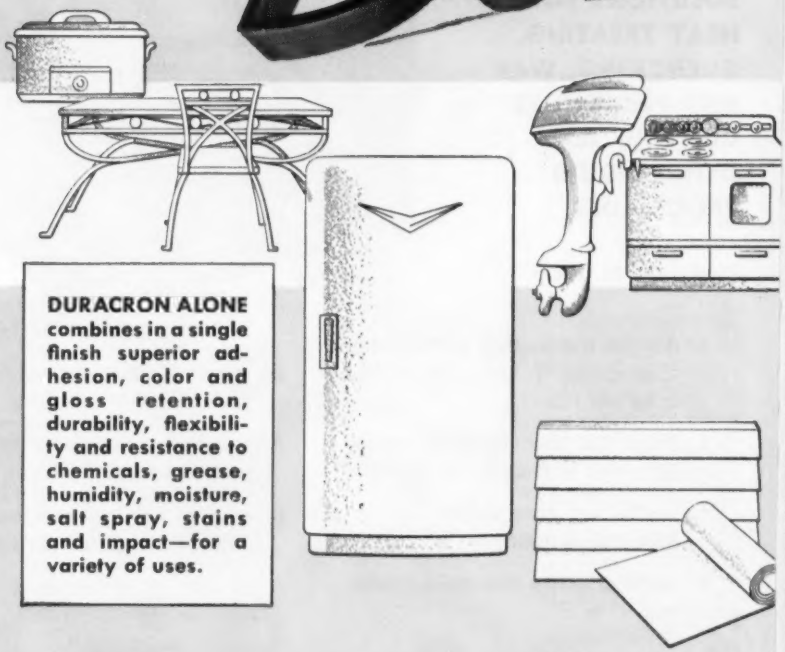
Offices and Representatives in Principal Cities

For more data circle 353 on Postpaid Card

# One coat does the worl

## AMAZING NEW

DURA



**DURACRON ALONE** combines in a single finish superior adhesion, color and gloss retention, durability, flexibility and resistance to chemicals, grease, humidity, moisture, salt spray, stains and impact—for a variety of uses.

# PITTSBURGH® PAINTS

75 ANNIVERSARY 1883–1958

SYMBOL OF SERVICE FOR SEVENTY-FIVE YEARS

PITTSBURGH PLATE GLASS COMPANY

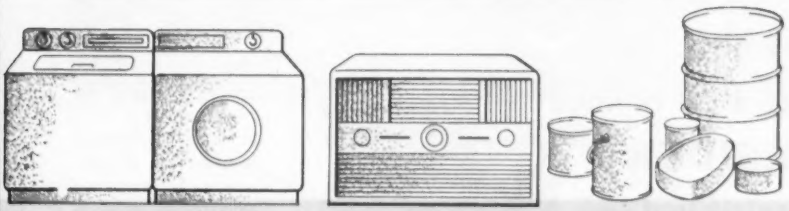
IN CANADA: CANADIAN PITTSBURGH INDUSTRIES LIMITED

For more data circle 354 on Postpaid Card

# of two . . . with

# CRON

**THERMO-SETTING ACRYLIC ENAMEL**



## Now . . . tailored to your finishing needs!

**Today's biggest news** in finishes is the development of amazing DURACRON in a variety of formulations for many end uses. Since its introduction, this revolutionary chemical composition has convincingly demonstrated its superiority to ordinary baking enamels. *One coat does the work of the conventional two-coat finishing system.*

• **Now . . . DURACRON** is made available in a wide range of properties to enhance sales appeal and utility of products on which it is used. It can be sprayed, dipped or roll-coated. It can be cured at lower temperatures. And it can be used either as a one-coat enamel or as a topcoat with various primers. Mail coupon for more information.

***Mail this coupon today for new book***

**Pittsburgh Plate Glass Company, Industrial Finishes Division, 1 Gateway Center, Pittsburgh, Pa.**

Gentlemen: Please send me your new brochure, containing information about DURACRON Thermo-Setting Acrylic Enamel, and how it reduces manufacturing costs.

**Name** _____

**Company** _____

**Address** _____

**City** _____ **State** _____

## Vacuum Metalizing Stripper

*Description:* A non-flammable stripper called Vac-Strip No. 3 removes vacuum metalized coatings from rejected parts and racks. Lacquers and aluminum are completely dissolved and held in solution by the stripper, reducing drag-out problems. Material inhibits rust formation on steel parts.

*How to Use:* Dilute with water, heat to 160-212 deg. F. Stripping time: 15 seconds to five minutes.

*Manufacturer:* Chemclean Products Corp., 610 Warren St., Brooklyn 17, New York.

For more data circle 5 on Reader Service Card

★ ★ ★

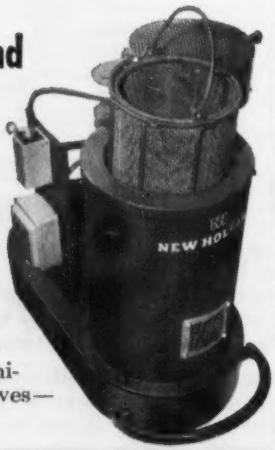
## High-Vacuum Valves

*Description:* Three small cast bronze right-angle vacuum valves recently introduced by the Rochester Division of Consolidated Electrodynamics Corporation are available for either pneumatic or manual operation.

Connections for the Type VRA Valves may be made with a solder joint (which eliminates a primary source of leaks), or with a standard NPT pipe-thread connection, which would be useful where valves may have to be removed. A solder connection is of particular importance in high-vacuum installations where a pressure of less than 10 microns of Hg is to be created and the elimination of the smallest possible leaks is a prerequisite for good performance. Available in ½-, 1-, and 1½-inch sizes.


**TWICE AS FAST!**

**Cut costs way down with Model 20 New Holland KREIDER Centrifugal DRYER**



**Does two operations at once** . . . Air-dries as it Spin-dries! Double action assures moisture-free surfaces in less time . . . eliminates scoring and marring . . . saves—start to finish!

**SPECIFICATIONS:**

1-h.p. motor—220, 440, 550 volts—2 or 3 phase. Spins 75-lb. loads at 825 r.p.m. Quiet V-belt drive. Arc-welded steel plate construction. Weight 490 lbs. Requires minimum floor space. Meets N.E.C. specs. Auxiliary electric or steam heating units available as optional equipment.

**Send for illustrated 4-page folder. Address Dept. PF-0958**

**NEW HOLLAND MACHINE COMPANY**
**NEW HOLLAND, PA.**
**For more data circle 356 on Postpaid Card**

Operator using NIALK TRICHLORethylene cleans more parts, because NIALK has **psp**, which prevents acid contamination, reduces number of cleanouts.

## Why you get **more effective degreasing** when you use NIALK® TRICHLORethylene with **psp**

There's a big, cost-cutting difference between NIALK TRICHLORethylene and conventional vapor-degreasing solvents.

Light, heat, air, acids, and active metals such as aluminum can break down improperly stabilized solvents, making them unfit for further degreasing.

**Nialk stabilizer has psp**—permanent STAYING power. You *never* have to replenish the stabilizer in NIALK TRICHLORethylene. It's neutral, non-alkaline, works equally well with *all* metals.

**psp means cheaper degreasing.** Even after repeated distillations, this unique NIALK stabilizer actively retards the formation of degradation products in your bath.

You don't have to clean the bath so often. You can degrease more parts between cleanouts.

**Get proof of Nialk's cheaper, safer cleaning.** Write on your business letterhead for a revealing resumé of comparative metallurgical tests made on NIALK TRICHLORethylene and four other leading brands.

**HOOKER CHEMICAL CORPORATION**
**1409 UNION STREET, NIAGARA FALLS, N. Y.**

*Sales Offices:* Chicago Los Angeles New York Niagara Falls Philadelphia Tacoma Worcester, Mass.
*In Canada:* Hooker Chemicals Limited, North Vancouver, B. C.
*Manufacturers of VIRGO® DESCALING SALT, VIRGO ELECTROLYTIC SALT, VIRGO MOLTEN CLEANER*

HOOKER CHEMICALS PLASTICS

6 1613

**For more data circle 357 on Postpaid Card**

For additional information on valves write for Bulletin 10-1.

*Manufacturer:* Rochester Division of Consolidated Electrodynamics Corporation, 1775 Mt. Read Boulevard, Rochester 3, N. Y.

For more data circle 6 on Reader Service Card

★ ★ ★

## Vinyl Fusion-Bond Finish

*Description:* Vinyl powders tradenamed "Corvel" are now available for use in the Whirlclad process, a fluidized finishing process available under license from Polymer Processes, Inc.

*How Applied:* Surface preparation procedures for metals prior to cladding parallel those normally used for solution processes. Where premium adhesion is indicated, a primer is available.

Metal parts to be clad are preheated to a temperature above the flow point of the vinyl resin and dipped into a bed of dry fluidized vinyl powders which encapsulate the object and bond by fusion onto the surface. Uniform cladding thicknesses of from 10 to 50 mils are obtained in a single dip.

*Characteristics:* Corvel vinyl finishes provide a surface free of drips, sags or pock marks, it is stated. Heat fusion holds the finish on edges, corners and projections. On wire products, the cladding holds to joints and intersections with a minimum tendency to bridge across gaps.

*Applications:* Dishwasher racks, washing machine parts, hardware, decorative panels or novelties. The ability of the fusion-bond finish to uniformly cover a metal member


THE NEW VERSATILE NON-DESTRUCTIVE COATING-THICKNESS TESTER

DERMITRON

Unit Process Assemblies, Inc., pioneers in non-destructive testing and specialists in electronics for metal finishing, offer their latest DERMITRON D-2 with these features:

■ Measures plated coatings on steel, brass, copper, zinc die-cast, aluminum, bronze and other metals; also, nickel on steel. ■ Measures anodize and hard-coat on aluminum and magnesium; also, paint, porcelain, organic coatings on non-ferrous metals. ■ Measures metal coatings on plastics, ceramics and other non-metallic materials. ■ Available with FOUR measuring probes for extra-wide thickness ranges from thin to thick deposits. ■ Only ⅛" circle area required for measurement. ■ You get fast, accurate, direct readings, plus versatility and portability. ■ Sorts metals and alloys.

Write for latest brochure and questionnaire to help solve your thickness testing problems.

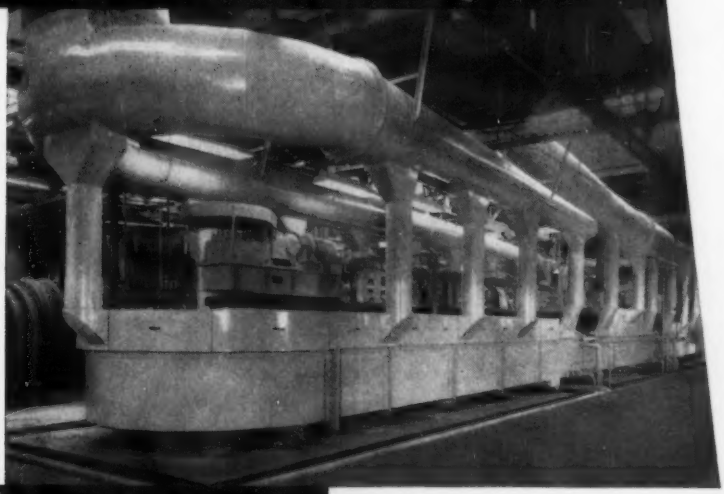
UPA

UNIT PROCESS ASSEMBLIES, INC.

61 East Fourth Street • New York 3, N. Y.

For more data circle 358 on Postpaid Card

**KIRK & BLUM FUME CONTROL SYSTEMS**
*protect personnel and equipment*



Saves 5 Ways...

**1. Reduces Air Volume • 2. Lowers Maintenance Costs**
**3. Cuts Replacement Costs • 4. Improves Working Conditions**
**5. Eliminates Damage to Equipment**

Many manufacturers throughout the nation rely on fume control systems engineered, fabricated and installed by KIRK & BLUM to protect personnel and equipment from damaging fumes.

In this installation the fumes are picked up at the outer periphery of the tank. Therefore, only clean air passes over the centrally located conveyor and plating equipment.

A KIRK & BLUM fume control system will soon prove itself with substantial savings in operating costs, as well as increasing life of vital equipment.

Write for Booklet "F" showing typical installations.

*The KIRK & BLUM MFG. CO., 3116 Forrer Street, Cincinnati 9, Ohio*

**KIRK & BLUM FUME CONTROL SYSTEMS**

**For more data circle 359 on Postpaid Card**

makes it valuable for industrial items requiring thorough chemical or electrical resistance qualities. Can be applied to laboratory or plating equipment, battery cases, used as pipe linings where resistance to organic acids or other corrosives is required. In the electrical field, bus duct, conduit and other parts requiring general purpose insulation can be clad.

*Manufacturer:* Polymer Processes, Inc., 125 N. Fourth St., Reading, Pa.

For more data circle **7** on Reader Service Card

★ ★ ★

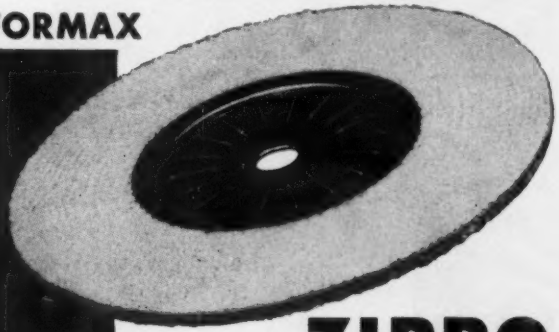
## Phosphate Coating

*Description:* A phosphate coating material recently announced by Turco Products, Inc., is said to provide an excellent base for paint. Called Turcoat 4333, the spray or dip-applied material deposits a zinc phosphate coating on iron, steel, zinc and cadmium. Weight: up to 400 milligrams per square foot.

*How Used:* Turcoat 4333, two to three per cent by volume, 170-185 deg. F., immerse for three to 30 minutes. Maintain proper concentration by addition of water or compound. Remove sludge every two weeks.

*Applications:* Designed for use on fabricated parts, such as auto body parts, sheet metal components, refrigerator, heater and washing machine parts, projectiles, bombs, mines, metal drawings, and so on. Turcoat 4333 meets USA - 57 - O - 2C, Type II, Class C and MIL-5002. For full technical


FORMAX



ZIPPO
SISAL BUFFS

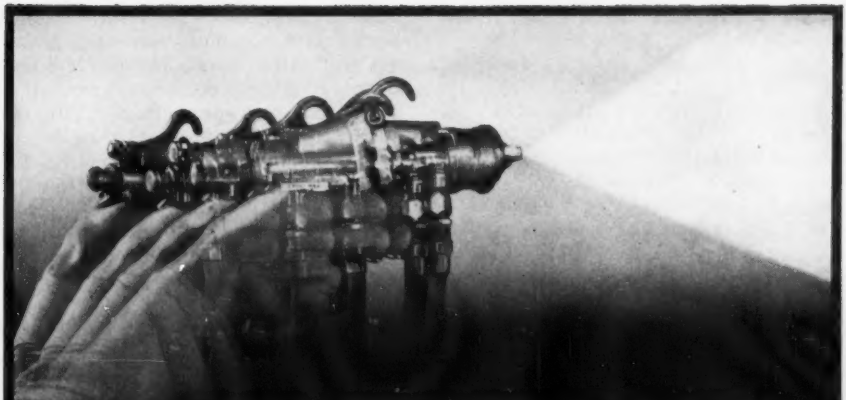
*A Dual-Purpose Polishing and Buffing Wheel!*

Call for Zippo Sisal Buffs when you have need for a fast cutting, heavy duty wheel to remove surface imperfections from ferrous metals. You will find they serve excellently to blend and smooth stretcher strains, orange peel, light die marks and polishing wheel grit lines. And—at the same time leave a bright surface finish.

*Write for Descriptive Literature*

FORMAX MFG. CORP.
DETROIT 7, MICHIGAN
"THE FOUR McALEERS"

For more data circle 360 on Postpaid Card



## BOOTH-STRIP® spray booth coating covers completely with one pass of the gun

Because a single coat of BOOTH-STRIP is all you need, you get about twice the coverage per gallon, and it takes about half as long to apply. *That means lower labor cost, less down time of spray booth.*

- **BOOTH-STRIP sprays on faster than a square foot per second. Covers entire booth in minutes. *Three-mil coat has tensile strength of 3,000 psi.***
- **Comes ready to spray with standard equipment. No mixing or thinning. Equipment cleans with tap water.**
- **Dries opaque white to improve visibility.**
- **Water-based, completely fire-safe and non-toxic.**

**STRIPS OFF EASILY WITHOUT TEARING**
Large areas of BOOTH-STRIP peel off readily in one piece from even the most irregular surfaces. Leaves spray booth clean as new.

Start saving money on spray booth housekeeping. Order a trial gallon of BOOTH-STRIP today.

**SPRAYLAT CORP.**
One Park Avenue, New York 16, N. Y.

**For more data circle 361 on Postpaid Card**

information, request Bulletin No. 108-19.

*Manufacturer:* Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1, Calif.

For more data circle 8 on Reader Service Card

★ ★ ★

## Small Ultrasonic Degreaser

*Description:* An economy-model ultrasonic degreaser called the "Econo-Sonic" is a complete solvent degreasing unit within itself, includes boil and rinse chambers, complete circulation and filtration, spray lance, 110-volt, 600-watt, 400-kc. generator.

*Manufacturer:* Detrex Chemical Industries, Inc., Box 501-A, Detroit 32, Michigan.

For more data circle 9 on Reader Service Card

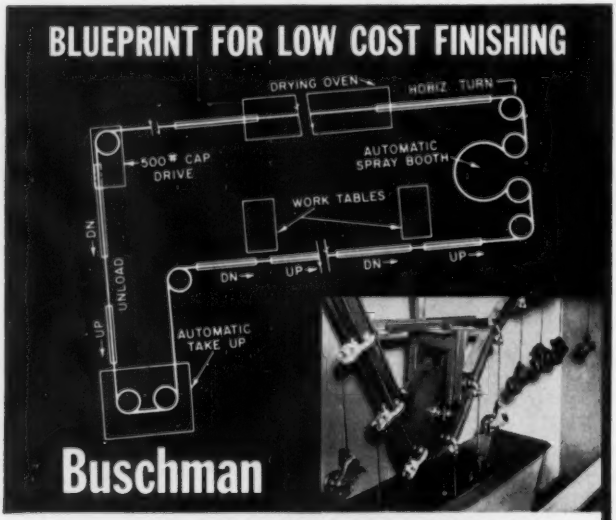
★ ★ ★

## Aluminum Paste

*Description:* An aluminum paste with improved leafing properties in alkyd and other types of synthetic-resin vehicles has been developed by the powder and paste research laboratories of Reynolds Metals Company.

Designated "Perma - Leaf" No. 7-311 paste, the product maintains leafing in many paint vehicles which normally cause de-leafing within a few days, according to the manufacturer.

The paste has been used successfully with some alkyds, alkyd melamines, urea formaldehydes and vinyls. Such use permits marketing of aluminum paints with these vehicles ready-mixed. Formerly these paints could be sold only in two-compart-


**CABLE CONVEYOR COMPONENTS**

Space-saving Bush-Lock Cable conveyors provide the sharp turns and short dips you need to efficiently make every foot of floor space pay off.

All types of operations are completed at lower cost . . . in less floor space . . . with Bush-Lock Cable Conveyors custom-built *on the spot* from the Buschman package of standard stock components.

Buschman specialists will cooperate with washer or oven manufacturers making a survey of your plant.

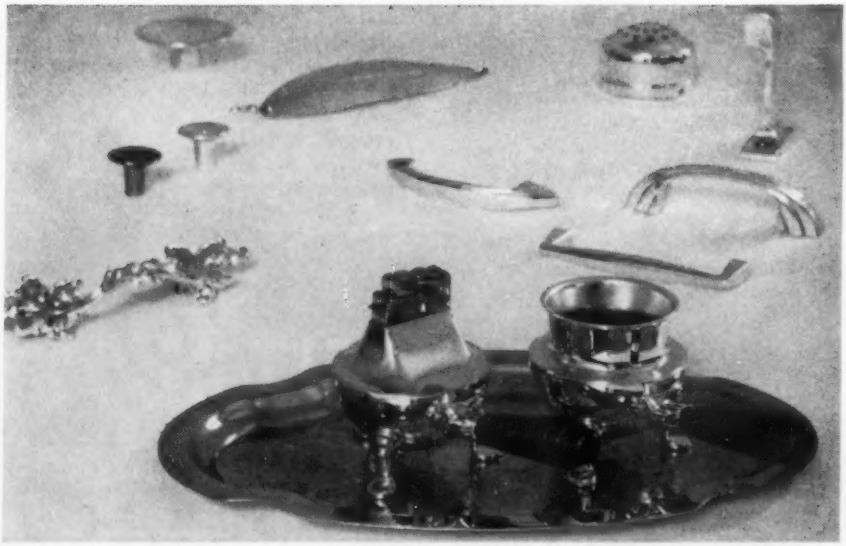
C-349-EWB

E W B Every Way Better

**THE E. W. BUSCHMAN CO.**

4516 Clifton Avenue • Cincinnati 32, Ohio

**For more data circle 362 on Postpaid Card**



Plated under vacuum, these articles have a high-sheen surface that lasts as long as conventionally plated pieces.

# *Why plating with* **vacuum** *is easier and more profitable*

Without buffing, polishing, cleaning baths, or highly skilled help, you can now plate articles with a shimmering finish that lasts indefinitely.

**Vacuum-plating costs less.** With a CEC vacuum coater and unskilled labor you can plate thousands of pieces per day—to look like gold, silver, copper, or a multitude of other colors and tones.

**New longer-lasting lacquers** make many vacuum-plated articles wear as well as those plated conventionally. The stayfast finish requires no retouching, or buffing, or polishing—just an easily applied coat of lacquer.

Write for information on CEC coaters.

**Consolidated Electrodynamics**
**Rochester Division, Rochester 3, N.Y.**

SALES AND SERVICE OFFICES IN PRINCIPAL CITIES

**For more data circle 363 on Postpaid Card**

ment containers, for mixing on the job.

*Characteristics:* Non-volatile materials, 70 per cent minimum, screen retention 325 mesh 1.0 per cent maximum, weight per gallon 12.12, specific gravity 1.45.

*Manufacturer:* Reynolds Metals Co., Richmond 18, Virginia.

For more data circle **10** on Reader Service Card

## *Tong Test Ammeter*

*Description:* A Tong Test Ammeter with improved features, recently introduced by Columbia Electric Manufacturing Co., measures both alternating and direct current.

*Tong Test Ammeter*

Included in the improvements made on this instrument are a larger damping chamber for each scale range, said to make reading easier by improving damping characteristics; heavier scale-range construction; and insulated trigger.

*How to Operate:* The operator presses the trigger on the instrument and snaps the tongs around an electrical conductor, without breaking the circuit or the insulation. Amperage is shown instantly.

The instrument is available in eight different types, will measure up to 1000 amperes.

**BARRETT** *Centrifugal* **DRYERS**

**For DIFFICULT DRYING JOBS and Heavy Loads up to 425 lbs.**

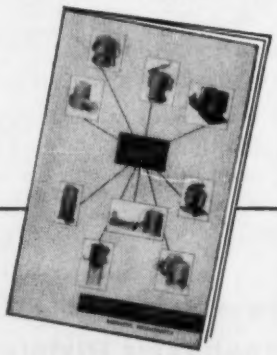
**RAPID ACCELERATION** of Barrett-built hi-torque motor snaps off surface moisture; built-in fan action dries parts quickly. For special applications, heater units are available.

**REVERSING ACTION** of motor will remove moisture even from cup-shaped or recessed parts.

**RUGGED CONSTRUCTION** provides for years of constant use with virtually no downtime or maintenance.

**OTHER BARRETT CENTRIFUGALS**

Washers • Oil Extractors
Enamelers • Galvanizers
Breakers • Impregnators



**SEND FOR 16 PAGE TECHNICAL BROCHURE.** Describes typical applications, special applications, design features, performance data, standard and special units.

**THE LEON J. BARRETT COMPANY**
**1449 GRAFTON ROAD**
**WORCESTER, MASSACHUSETTS, U.S.A.**
**For more data circle 364 on Postpaid Card**

Alkalume AC#1 is a safe, easy to use, non-silicated liquid used at low concentration with water. This latest addition to Northwest's outstanding line of specialized chemicals for use with today's modern metals offers these desirable features—

- Non-alkaline, non-etching, non-filming.
- Gives uniform, unblotched brilliance.
- Wets out unusually well.
- Ideal as follow-up to heavy-duty precleaner.
- Excellent as single stage cleaner for light soil.
- Economical to use.
- Unusually long service life.
- Non-hazardous, no offensive odor.
- No disposal problem.

Complete details will be sent upon request.

*"The name NORTHWEST means first with the best."*

LO HI pH

**NORTHWEST CHEMICAL CO.**

9310 ROSELAWN DETROIT 4, MICH.

For more data circle 365 on Postpaid Card

*Manufacturer:* Columbia Electric Manufacturing Co., 4519 Hamilton Ave., Cleveland 14, Ohio.
For more data circle 11 on Reader Service Card

★ ★ ★

## Aerosol Rust Preventive

*Description:* Anderol L-536 is a nonflammable aerosol-packaged rust preventive that can be sprayed on dies, molds, assemblies, parts, and machinery to provide temporary rust protection during manufacturing and storage. In most cases, it is not necessary to remove the light film produced prior to final finishing.

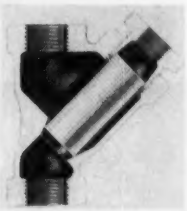
*Rust Preventive*

*Manufacturer:* Lehigh Chemical Co., Chestertown, Maryland.
For more data circle 12 on Reader Service Card

★ ★ ★

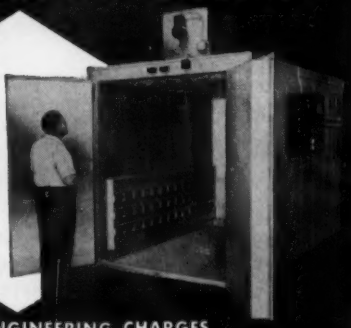
## Pipeline Strainer

*Description:* A self-cleaning pipeline strainer (Type AT) recently introduced by Sarco Co., Inc., has high-strength semi-steel body, an internal design that ensures tight fit of the screen without buckling,



*Pipeline Strainer*

SAVE INSTALLATION TIME with GRIEVE-HENDRY WALK-IN OVENS



• Shipped completely "Set-Up"— Previously Tested and ready to operate

6 STANDARD MODELS NO ENGINEERING CHARGES

Save time and money by buying Grieve-Hendry STANDARD WALK-IN OVENS.
Shipped promptly at lower cost because they have been engineered to standards, thereby saving time and extra engineering charges.
Shipped set-up — ready to work — just uncrate and make service connections to outlets provided — no installation crew or tie-up in your plant necessary.
Latest convenience features and safety devices included. Design changes to suit special requirements. Electric, gas or oil heated. Write for bulletin.

• Prompt quotations on ovens to your specifications.
• Standard models to 1200° F.-$110,50 and up.
• Sales engineers in all principal cities and many foreign countries.

GRIEVE-HENDRY CO., INC.
1414 W. Carroll Ave. Chicago 7, Ill.
Export Dept., 10406 S. Western Ave., Chicago 43, Illinois
For more data circle 366 on Postpaid Card

# THIS COATING HAS "LIFE INSURANCE"

*...that's one more of the advantages of Unichrome Coating 218X*

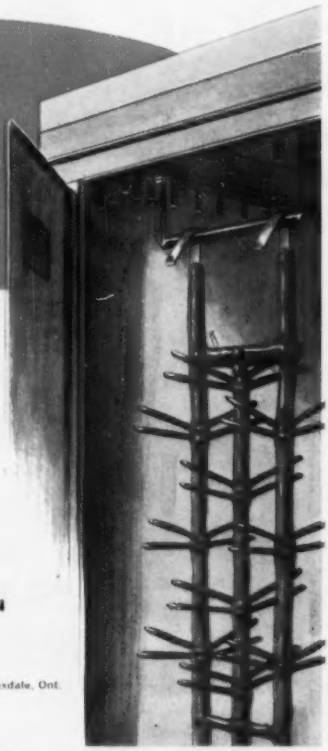
Racks are ready for long life under roughest service conditions with Unichrome Coating 218X. So tough is this quality plastisol rack insulation, that damage is a rarity. It won't chip, crack, tear . . . is highly resistant to abrasion.

But even if accidental damage does occur, coating life is still not shortened. Coating 218X can be patched and rebaked with no loss of toughness or resiliency. Like new, the rebaked coating will continue to survive strongest plating and cleaning operations, including vapor degreasing cycles.

Platers have been saving maintenance money for over 10 years now with Coating 218X . . . first in the field. They have proved for themselves that using the best quality at the outset saves most money in the long run. Send for more details.

*Are you using the rack coating that gives you ALL FIVE?*

1. *Built-in cure indicator assures maximum performance*
2. *No contamination of plating baths*
3. *Ability to be rebaked for patching*
4. *Nationwide set-up of expert applicators*
5. *Highly qualified technical service.*



UNICHROME

*First name in plastisols for all plating purposes . . .*

**METAL & THERMIT CORPORATION**

Member, Vinyl Dispersions Division of the SPI

GENERAL OFFICES: RAHWAY, NEW JERSEY

Pittsburgh • Atlanta • Detroit • E. Chicago • Los Angeles

In Canada: Metal & Thermit—United Chromium of Canada, Limited, Rexdale, Ont.

**For more data circle 367 on Postpaid Card**

perforated heavy-gauge screen with spot welded seams that ensure maximum rigidity and smooth inner surfaces. Built-in sediment-collection chamber integral with cap.

The 45-degree design of this strainer facilitates clearing by blow-off. Strainer is rated for saturated steam or liquids to 250 p.s.i. and 475 deg. F. Sizes available: ¼ to 3 inches.

*Manufacturer:* Sarco Co., Inc., 635 Madison Ave., New York 22, N. Y.

For more data circle 13 on Reader Service Card

★ ★ ★

## Electrode Rod Insulator

*Description:* A recently introduced electrode rod known as the "Uni-Bolt" is attached with a single bolt, provides built-in insulation, with no spacer required. It is covered with a heavy plastisol coating that is resistant to acids and alkalies used in cleaning and plating tanks.

*Electrode Rod Insulator*

*Manufacturer:* Davies Supply & Manufacturing Co., 4160 Meramec St., St. Louis 16, Mo.

For more data circle 14 on Reader Service Card

★ ★ ★

## Cyanide Copper

*Description:* A cyanide copper plating process recently announced by R. O. Hull & Co., Inc., is said to produce

For more data circle 368 on Postpaid Card

# For clean, accurate, dependable heat—

# CONVERT TO CHROMALOX

# ELECTRIC IMMERSION HEATERS

- **Portable, screw-plug, flanged types; full range of sizes and ratings.**
- **"Packaged" units—complete heating element and thermostat assembly.**
- **Choose from copper, steel, alloy or lead sheath materials.**
- **Explosion and moisture-resistant terminal boxes available.**
- **Most sizes ready NOW for immediate shipment.**

## For these applications:

Heating water, oils, Dowtherm, Prestone, tars, greases • Plating, cleaning and pickling solutions • Heating tanks, drums, process kettles • Melting greases, asphalt, other viscous fluids • Super-heating steam, compressed air • Melting lead, solder, babbitt and stereotype metal.

2617

CHROMALOX

*Electric Heat*

INDUSTRIAL • COMMERCIAL • RESIDENTIAL

EDWIN L. WIEGAND COMPANY

7522 Thomas Boulevard • Pittsburgh 8, Pa.

## Free Catalog

Write today for Catalog 50. Gives full details (including prices) for Chromalox Heaters that provide the electrical answer to your industrial heating problems.

For more data circle 369 on Postpaid Card

a bright plate with excellent uniformity of plate distribution in both high and low current density areas. The bath can be operated at current densities up to 80 a.s.f.

*Characteristics:* Gives good results with direct, periodic reverse or interrupted current. May be used with potassium, sodium or mixed formulations to produce semi-bright or full bright copper. Used with or without Rochelle salts. Three addition agents (wetting agent, primary and secondary brighteners) allow deposition of any plate from semi-bright to full bright. Bath is easily controlled with Hull Cell.

*Manufacturer:* R. O. Hull & Co., Inc., 1304 Parsons Ct., Rocky River 16, Ohio.

For more data circle **15** on Reader Service Card

★ ★ ★


**PAINT STRIPPING CLINIC!**

***Send Us Your Tough Stripping Problems for Fast Action!***

**10 YEARS OF BECK PAINT STRIPPING CLINICAL SERVICE Saves Thousands of $$$ for Customers—Who Now Use World-Famous...**

**EPOXYSTRIP**

Better find out for yourself . . . about Epoxystrip, Econostrip and other Beck Paint Remover lines and formulations. Use the BECK CLINIC SERVICE — send us several parts, sections, or test panels (properly tagged) of the work to be stripped.

Write or 'phone giving us essential information—your problem details, requirements, tanks available, hot or cold, etc. This service, and our prompt report, are free, with no obligation.

*Beck Strippers outstrip all others — removing organic finishes, epoxies, etc., as easily as baked enamels, lacquers, etc. No stripping scum — clean rinsing!*

**SEND FOR FREE BROCHURE**

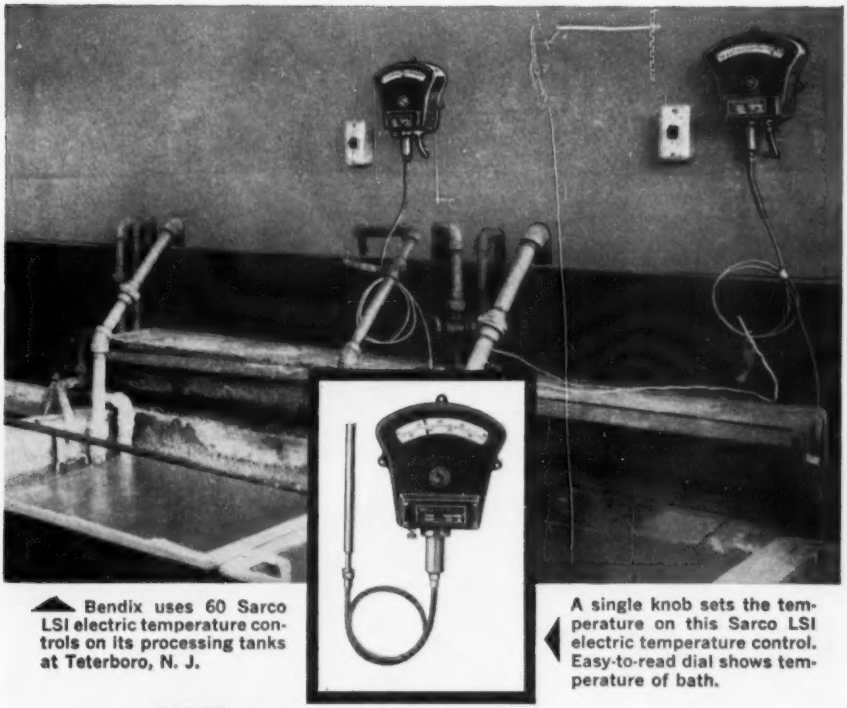
**BECK EQUIPMENT COMPANY**
3350 WEST 137th STREET — CLEVELAND II, OHIO

**For more data circle 370 on Postpaid Card**


## Gloves

*Description:* Industrial gloves made of Du Pont Teflon are said to be completely impervious to strong acids and solvents. Tested under the severest conditions, the gloves are said to be unaffected by fuming red and white nitric acids, 100 per cent sulfuric acid, and strong solvents. They are avail-

*Teflon Gloves*



Bendix uses 60 Sarco LSI electric temperature controls on its processing tanks at Teterboro, N. J.

A single knob sets the temperature on this Sarco LSI electric temperature control. Easy-to-read dial shows temperature of bath.

# How Bendix controls temperatures in 60 processing tanks with Sarco Electric Indicating Regulators

In the completely modernized plating department of Eclipse-Pioneer Division of Bendix Aviation Corporation at Teterboro, N. J., temperature in all processing tanks is controlled with Sarco LSI Regulators. This standardization has paid off in accuracy, dependability, and economy. Among the varied processes for which LSI's are now used are Black Dye, Dichromate Seal, Parker Lubrite, Hot Water Rinse, Electro Cleaner, Passivate, Black Oxide Copper and Chromium Plating.

## You can get a complete Sarco system for as little as $130 a tank

This Sarco LSI makes it unnecessary to rely on erratic manual temperature control. Further, the low initial cost of the LSI and its almost negligible maintenance cost mean completely dependable temperature control with real economy. Call your nearest Sarco representative, or write for details on Sarco LSI temperature controls and your copy of Sarco Case History No. 174. 5927-A

**SARCO**
COMPANY, INC.

635 Madison Ave., New York 22, N. Y.

For more data circle 371 on Postpaid Card

able in 12- and 16-inch lengths.

*Manufacturer:* Surety Rubber Co., Carrollton, Ohio.

For more data circle **16** on Reader Service Card

★ ★ ★

## *In-the-Tank Filter*

*Description:* Convenient filtering of plating solutions is made possible by an in-the-tank filter announced by Belke Manufacturing Co.

The filter assembly includes filter unit, motor-driven pump, and discharge hose. The filter unit hangs on the tank wall, in the plating solution.

The motor-driven pump, rated at 300 g.p.m., draws plating solution through the filter unit and returns clarified solution to the plating tank. As many filter units may be used as required to provide the needed capacity. In-the-tank filters are easily moved from tank to tank.

The standard filter bag is paper, which requires no pre-coat of filter aid for most solutions. To clean, the paper filter bag is removed and replaced with a new one.

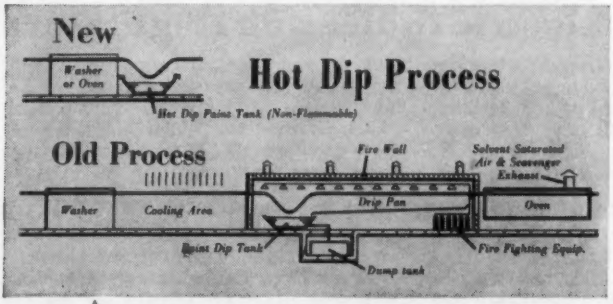
Filter bags of Dynel, Vinyon, Nylon or cotton twill can be furnished. To pre-coat these or the paper bags with filter aid or carbon, the pre-coat materials are mixed with water. Operating the filter in the mixture pre-coats the filter bag; then filter unit and discharge hose are transferred to the plating tank without stopping the pump.

To clean, the filter unit is washed in a drum or placed over a drain and the old cake flushed off with hose. In-the-


**NEW**
**PAINT SAVER**

***Revolutionary Hot Dip Process.***
***David-Ludwig Company solves your PAINT FINISHING problems.***

This hot dip process has greatly simplified paint dip operations with resultant savings in *paint usage, floor space* and *initial cost.* The process consists of preheating the article and dipping it into a paint operating at 160° F. Leaving the tank the solvent is instantly evaporated from the paint by the heat radiating from the article. This provides *quick drying, uniform thickness* and *drip-free coat.* Since the solvent used is trichlorethylene the system is *fireproof,* providing *safety* for plants and employees. Contact A. D. Ludwig, Vice President, for additional information.




David Ludwig co.

*Manufacturers and Installers of:*
Finishing Systems
Ventilating Systems
Dust Collecting Systems

14290 Goddard Avenue, Detroit 12, Michigan

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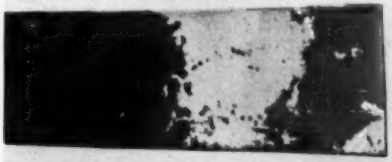
# NEW ADDITIVE INCREASES STRIPPING POWER!

Metal panels coated with a tough epoxy finish have been used to show the superior stripping results obtained when Magnus Activall is added to the caustic stripping tank. This easy-to-use additive . . . proved its effectiveness by completely stripping the finish from one plate, whereas a similar plate dipped in a stripping solution without the additive showed pigment residues which would have had to be removed by hand work and thus . . .

"Without Magnus Activall"



"With Magnus Activall"

- Increases caustic stripper efficiency
- Cuts stripping time
- More completely removes pigments
- Eliminates hand labor
- Increases stripping solution life
- Economical
- Easy-to-use

***Write for special bulletin.***

**MAGNUS CHEMICAL COMPANY, INC.**
**208 SOUTH AVENUE, GARWOOD, NEW JERSEY**

Please send me free bulletin on Magnus Activall.

NAME.....

POSITION.....

COMPANY.....

ADDRESS.....

CITY..... STATE.....

INDUSTRIAL DIVISION

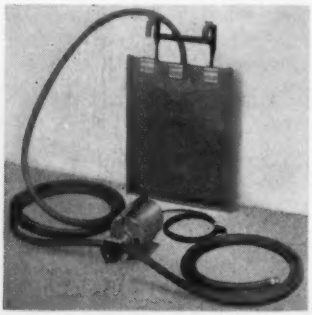
**magnus**
CHEMICAL COMPANY INC.

**magnus** a world-wide organization specializing in cleaning and protection of all surfaces.
For more data circle 373 on Postpaid Card

tank filters can be furnished for all types of acid or alkaline plating solutions.

*Manufacturer:* Belke Manufacturing Co., 947 N. Cicero Ave., Chicago 51, Illinois.

For more data circle 17 on Reader Service Card



*Belke In-the-Tank Solution Filter Unit*

★ ★ ★

## *Abrasive Belt Grinder-Polisher*

*Description:* A versatile abrasive belt grinder-polisher combination is useful in various grinding, polishing, buffing and deburring applications.

This machine, Model UBG-50, will perform contact wheel, contour wheel, flexible belt, platen and internal polishing operations. It has a U-2 head on the right and a U-1 head on the left. The U-2 head accommodates abrasive belts 72 to 90 inches long and one to two and one-half inches wide; the U-1 head takes belts 56 to 70 inches long and one-half to one inch wide.

Advantages include greater throat

INCREASE 20% OR MORE

YOUR ZINC PLATING PRODUCTION SPEED WITH PROMAT'S AMAZING GRAIN REFINING AGENT FOR ALKALINE ZINC SOLUTIONS PROZN C-42

• ANTI-BURNING! • INEXPENSIVE TO USE! • IDEAL BASE FOR CHROMATES! • HIGH CURRENT DENSITY GRAIN REFINER! • DEPLETED ONLY BY DRAG-OUT! • LOW CONCENTRATION! • TRIED AND TRUE FOR 15 YEARS! • SAMPLES PROCESSED FREE!

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METAL FINISHING CHEMICAL DIV.

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WAUKEGAN, ILLINOIS

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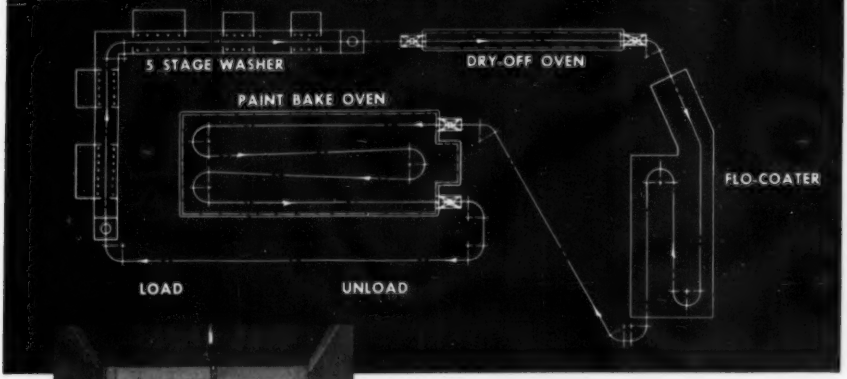
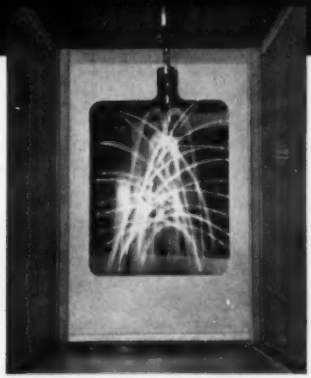
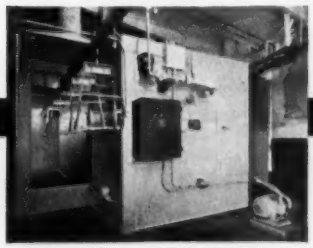
# INTEGRATED



Unique lacquer Flo-Coater has wide flare and long flow path to suit the product—supermarket shopping carts and baskets. Compact MOCO installation gives substantial savings in coating materials over other systems.

Air-jet "curtains" at entrance and exit of MOCO baking oven act as a barrier against heat loss. The system is fully equipped with electronic flame failure safeguards.



## Finishing Systems– *Cost Controlled* for Modern Production

*Integrated* Finishing Systems are more than just a plan and installation designed to meet the customer's needs in materials, space and output. At Michigan Oven, engineering a cost-controlled finishing system means equipping for today's demands, and for tomorrow's production.

The lacquer Flo-Coating system illustrated above is a complete and efficient system. Behind its installation lies a thorough study of the plant, of the product, of quality control and initial investment.

This finishing system will pay for itself in a relatively short time. It's engineered for economy, low maintenance and safety—and it will adapt readily to future expansion at low cost.

Send for a free MOCO bulletin showing typical finishing system applications, including products, process and specifications, or write for the name of the MOCO representative nearest you.

F-1

**MICHIGAN OVEN COMPANY**

MOCO

FINISHING EQUIPMENT DEPARTMENT

431 BRAINARD, DETROIT 1, MICHIGAN

Washing Machines • Bonderizing Units • Dry-off Ovens • Dip Tanks • Spray Booths • Flo-coaters • Finishing Ovens • Conveyors

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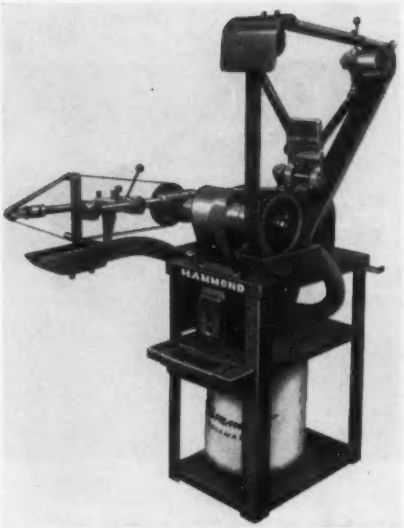



*Hammond Model UBG-50 Abrasive Belt Grinder-Polisher: two heads, many uses*

depth to accommodate awkward-shaped parts; and a small head for flexible belt and internal grinding.

Attachments available for the machine include a dust collector and a rod-grinding and chamfering holder.

*Manufacturer:* Hammond Machinery Builders, Inc., 1622 Douglas Ave., Kalamazoo, Mich.

For more data circle **18** on Reader Service Card

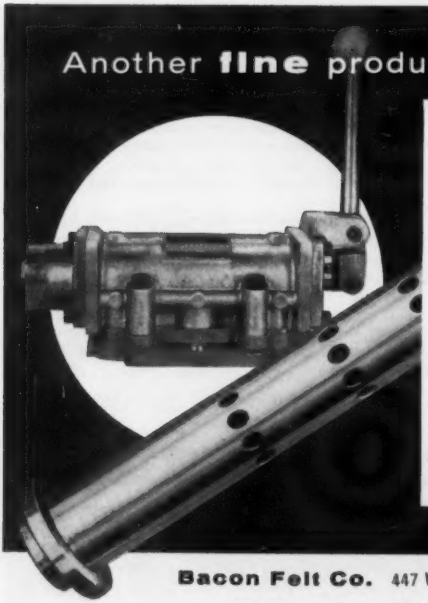
★ ★ ★

## *Barrel Finishing Machine*

*Description:* Model 30-34 HPT is a heavy-duty finishing machine for grinding, deburring and burnishing parts, is constructed so as to facilitate rinsing parts thoroughly after grinding and before burnishing.

*Loading and Operating:* Parts are loaded while the barrel is tilted 40 degrees above horizontal. Compound and water are added, cover is put in place. Parts can be finished in a tilted position, but better action is obtained in


Another **fine** product made **finer** . . .



with the PARAMOUNT "Finishing Touch"

"We require that the finish on both our stainless steel and chromium plated valve plungers be held within 7 to 12 microns," says C. B. Hunt & Son, Inc., manufacturers of precision pneumatic and hydraulic pressure valves. "Finish is a vital factor as it affects the seal of the valve. Our experience has proved that Paramount Felt Wheels are best for this buffing operation. We use an extra soft wheel with a white chrome buffing composition to give a fine polish without destroying close tolerances."

Precision finishes with Paramount Felt Wheels save time and money for hundreds of manufacturers, as they will for you. Contact your jobber today.

*Paramount*
Felt Wheels, Bobs, Sheet Felt

**Bacon Felt Co.** 447 West Water St., Taunton, Mass.

**For more data circle 376 on Postpaid Card**

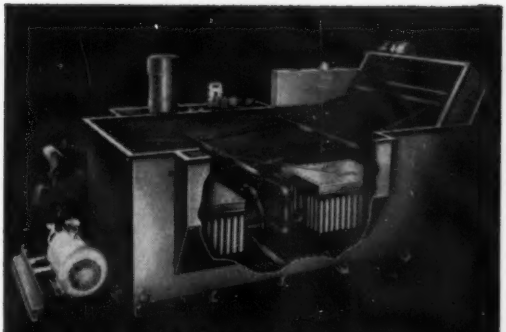
*to serve your filtration needs better....*

## COMMERCIAL FILTERS CORPORATION ACQUIRES

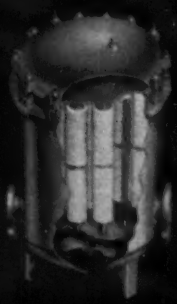
# Delpark

Now, from one source, you can meet your complete needs for fine filtration through three broad lines — Delpark Filters, Fulflo Filters, and CFC Filters which include Honan-Crane and Michiana models.

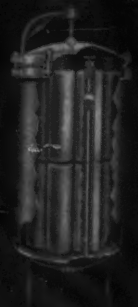
To provide more comprehensive service, Commercial Filters Corporation has acquired the Industrial Filtration Company, manufacturers of Delpark Filters. The company will operate as the Delpark Division of Indiana Commercial Filters Corporation, Lebanon, Indiana.



**Delpark FILTERS** Delpark offers a large selection of filters for coolants, cutting oils, quenching oils, rolling oils, and lubricants — for both heavy and light dirt loads. Products also include a filter for paint spray booth water. Filter media consist of natural or synthetic fibres and metal screens in tubular or leaf form.



**Fulflo FILTERS** Fulflo Filters, with genuine Honeycomb Filter Tubes in a variety of natural and synthetic fibres, offer true depth filtration to any degree of continuous micro-clarity. Applications include all kinds of oils, fuel, water, chemical solutions, compressed air, $CO_2$ and other gases. For high or low flow rate, pressure, viscosity.



**CFC FILTERS** CFC Filters, including Honan-Crane and Michiana models, provide selective filtration of all types of oils — lubricating, coolants, quenching, hydraulic, diesel, etc. Bulk and cartridge type elements. Products also include impregnating oil dehydration units, magnetic separators, automatic tubular conveyors, coolant clarifiers, and settling tanks.

**COMMERCIAL FILTERS CORPORATION**
MELROSE 76, MASSACHUSETTS
PLANTS IN MELROSE, MASSACHUSETTS AND LEBANON, INDIANA

**MICRO-CLARITY AT MINIMUM COST**

Fulflo FILTERS — *with genuine Honeycomb Filter Tubes for controlled micro-clarity of industrial fluids.*

CFC FILTERS — *Selective filtration of oils • water-oil separators • magnetic separators • pre-coat filters • coolant clarifiers • automatic tubular conveyors.*

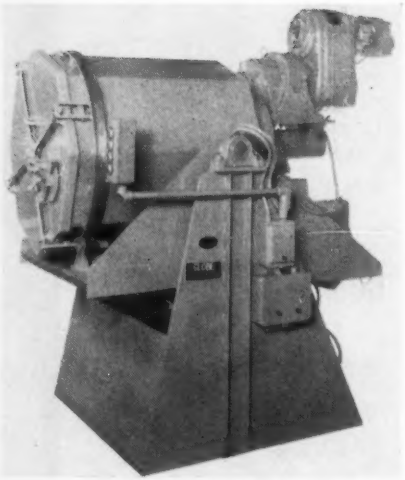
**For more data circle 377 on Postpaid Card**

horizontal position.

*Rinsing and Unloading:* After grinding or deburring cycle, barrel is tilted up and the sieve cover is put in place; barrel is then tilted to 10 degrees below horizontal and water pipe is placed in center hole for rinsing. Rinse cycle can be as long as necessary to thoroughly flush out all compound, abrasives and fines. Barrel is rotated while flushing. After rinsing, tilt barrel up to add water and compound for burnishing operation.

*Specifications:* Barrel size, 30 inches across by 34 inches long, one compartment, octagon; capacity: 14.7 cubic feet; variable-speed (6 to 30 r.p.m.) or single-speed models (29, 23, 19, 15, 12 or 10 r.p.m.).

*Manufacturer:* Globe Div., Casalbi Co., 540 Wayne St., Jackson, Mich.



*Model 30-34 HPT Barrel Finishing Machine*

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DEPENDABLE PPI PRODUCTS

PLATING RACKS
RUBBER DRUM LINERS
ACID CONTAINERS
ANODE HOOKS
FIBERGLAS TANKS
DUCTS & HOODS
PLASTIC COATED DIPPERS & PAILS
STEEL & STAINLESS STEEL TANKS
LEAD & PLASTIC LINED TANKS
POLYETHYLENE PAILS & CONTAINERS
FUME SEPARATORS
PLATE COILS
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DEGREASING SOLVENTS
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DURABLE and INEXPENSIVE
EXPANDED METAL BASKETS
PLAIN or PLASTISOL COATED

- Cheaper Than Monel or Stainless Steel
- Ideal for Pickling, Plating, or Centrifugal Drying of Small Parts
- Extra Long Dependable Production Life

Rugged construction . . . Expanded metal sides, perforated bottoms, reinforced welded steel frames, with stainless steel bail and brackets. Baskets supplied Plastisol coated or uncoated.

*Wide Choice of Types and Sizes to Fit Your Needs...*

| Stock No. | Dia. | Depth | Exp. Mtl. | Ga. | Price (uncoated) | Price (coated) |
|---|---|---|---|---|---|---|
| XB100 | 11½″ | 12″ | ¼″ | 18 | $14.95 | $22.50 |
| XB101 | 11½″ | 12″ | ½″ | 13 | 14.95 | 22.50 |
| XB200 | 11½″ | 15″ | ¼″ | 18 | 15.95 | 23.50 |
| XB201 | 11½″ | 15″ | ½″ | 13 | 15.95 | 23.50 |
| XB300 | 15″ | 20″ | ¼″ | 18 | 24.00 | 34.50 |
| XB301 | 15″ | 20″ | ½″ | 13 | 24.00 | 34.50 |

*Above sizes are before Plastisol Coating*

Orders Filled Promptly . . . PLACE YOUR ORDER TODAY

PLATING PRODUCTS, Inc.

1509 N. WASHINGTON
KOKOMO, INDIANA

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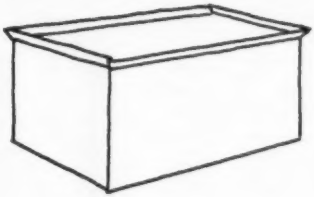
## stop losing costly Anode metal

## ...use RED LABEL DARCO®



It's easy to cut the waste of costly anode metal due to plating rejects . . . by using Red Label DARCO activated carbon to keep your plating bath clean.

You'll get better plating quality . . . lower plating costs. DARCO wets quickly . . . keeps your shop clean. Its high density reduces time and labor for dumping filters by up to 50%. Red Label DARCO is the standard of the industry—the carbon chosen by custom electroplaters and plating departments everywhere. It's the only carbon made exclusively for the plating industry.

Your nearby DARCO distributor can show you how to use DARCO most effectively. Order from him today.

DARCO IS MADE BY ATLAS CHEMICALS DIVISION ATLAS POWDER COMPANY WILMINGTON 99, DELAWARE

*In Canada:* Atlas Powder Company, Canada, Ltd. Brantford, Ontario, Canada

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"For that Finishing Touch"

Duracoat®

chromate conversion coatings for zinc, cadmium, copper, brass, bronze and aluminum. Now available in dyed colors as well as clear, irridescent, golden or olive drab. Supplied in liquids or powders.

Write for literature, send samples for treatment or give us your problems — our laboratory staff is available to help solve them.

A new folder describing the full line of black oxide finishes, chromate finishes, cleaners, oils, and strippers is yours for the asking.

HEATBATH
CORPORATION
SPRINGFIELD 1, MASS.
or 701 North Sangamon Street, Chicago 22, Illinois

35 Years of Service to the Heat Treating and Metal Finishing Industry

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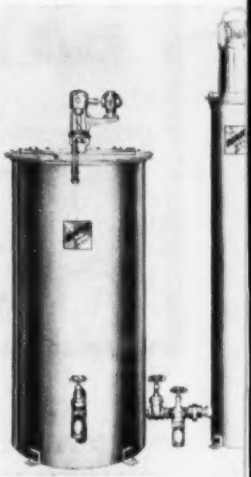
## High-Volume Paint-Circulating System

*Description:* A high-volume paint-circulating system called the "Kayo" will supply more than a mile of paint circulating line — up to 55 spray painting stations.

The air motor and pump section of this unit are designed for large installations. They operate at minimum speeds, with minimum air consumption. The Kayo 32, largest unit in the line, delivers 32 ounces of paint with each stroke — one gallon every two cycles.



*Kayo 32 Paint Pump*

All of the pumps in this series operate on the automatic-demand principle. When demand on the system is low, the pumps operate slowly, but when more spray guns are opened, the pumps speed up immediately to supply more material.

Air motor and pump section are completely separate. Paint cannot enter the air motor.

Bulletin A41-5, describing the Kayo Series of paint pumps, is available from the manufacturer.

*Manufacturer:* Binks Manufacturing Co., 3118-40 Carroll Ave., Chicago 12, Illinois.

For more data circle **20** on Reader Service Card

★ ★ ★

## Phosphatizing Analysis Kit

*Description:* A phosphatizing analysis kit that enables manufacturers in the metalworking field to determine

ROBERT A. NYQUIST, CHIEF CHEMIST
THE ELECTRIC AUTO-LITE COMPANY
BAY MANUFACTURING DIVISION
BAY CITY, MICHIGAN

"In our aluminum anodizing operation, we were encountering excessive gassing from our 15-18% sulphuric acid solutions.* In addition, we were getting a severe sulphate build-up on our lead cathodes and copper bus which was hindering our current carrying capacities. We couldn't control this problem even with our push-pull ventilation, so we began looking about for an effective method of suppression. And we found it!

"With the addition of just *one pound* of Udylite 'Zero-Mist' per 1,000 gallons of anodizing solution, we now control sulphuric mist and hold the spray down to 2-3 inches from top of the solutions. This was checked by saturating filter papers with alkaline phenolpthalein solution and suspending the papers at various levels before and after the addition of 'Zero-Mist' (see inset). The addition of 'Zero-Mist' made necessary by dragout is easily determined by visual and nasal observations. This easily maintained additive is our simple solution to an otherwise difficult processing problem."

Using Udylite 'Zero-Mist' in the anodizing operations such as the Electric Auto-Lite installation, is just one more application for the versatile 'Zero-Mist' family. Let your local Udylite representative demonstrate the many time and money saving advantages of 'Zero-Mist' at your convenience. Call him now, or write direct to:

*Zero-Mist has proven satisfactory in Chromic acid solutions also.

the udylite corporation

detroit 11, michigan • world's largest plating supplier

**For more data circle 381 on Postpaid Card**

*Turco's Phosphatizing Analysis Kit*

whether their products are suitable for phosphatizing is available from Turco Products, Inc. The kit is free to anyone in the metalworking field.

Turco also announced that its line of phosphatizing products has been broadened to include processes that can be used on a wide variety of products and in many existing production setups. Processes now range from three-tank setups to 11-stage spray washing systems.

*Manufacturer:* Kit is available from Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1, Calif.

For more data circle 21 on Reader Service Card

★ ★ ★

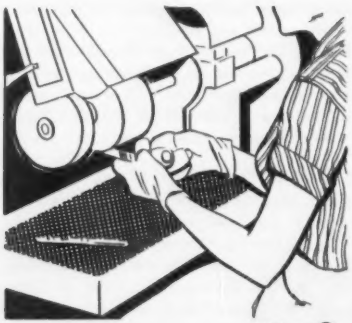
## Spray-Decorating Machine

*Description:* Model 4800 spray mask painting machine is engineered for decorating large parts.

The part being decorated is held firmly in the mask by an air-actuated pressure pad, which prevents over-

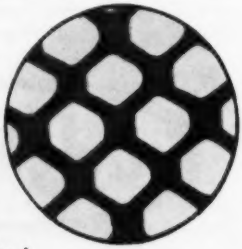

**PROTECT FINE PLATED SURFACES**

*with* **RP** *Neotex*



Neotex . . . the open pattern Neoprene rubber matting, protects highly polished finishes when used to line any surface where goods are worked on or in transit. In roll form, Neotex can be easily cut to any size or shape . . . it's rugged and long lasting, resistant to abrasives, caustics, heat, acids, oils, oxidation. Open pattern permits buffing compounds to settle. Available in a fine or coarse pattern. Write for complete information.

RP *Neotex*®



RESEARCH PRODUCTS CORPORATION

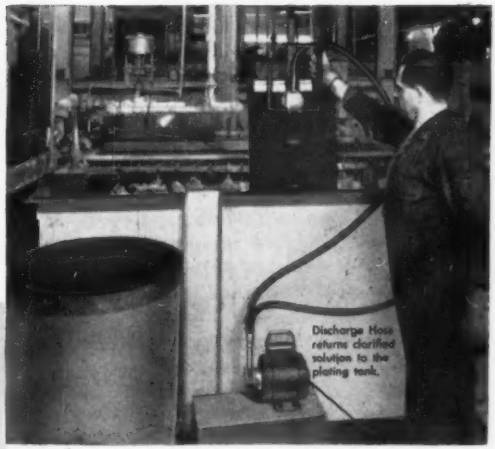
Dept. 76, Madison 10, Wis.

For more data circle 382 on Postpaid Card

# *New* BELKE In-the-tank Filter for plating solutions

Adjustable Brackets for attaching to tank flange
Suction Hose from Filter Unit to Pump.
Filter Unit 17x22"
Plug-in Cord
Discharge Hose
Pumps available for all plating solutions.

*In-the-tank Filter assembly*




*In-the-tank filter unit coated with filter aid and carbon being transferred from coating drum (at left) to plating tank.*

- **Filters like magic**
- **Effective and dependable**
- **Simple and easy to use**
- **Adaptable to wide range of volume requirements and all plating solutions.**
- **Cuts costs — *TREMENDOUSLY***

## *How the New BELKE In-the-tank Filter works!*

The Filter Unit, the part that does the clarifying, hangs on the tank, right in the solution.

The motor driven pump, rated at 300 gallons per hour, pulls solution through the filter and pours clarified solution back into the plating tank. Any number of units can be used to provide the required filtering capacity.

To clean, the filter unit is merely lifted from the tank and the old paper filter bag replaced with a new one in a matter of seconds.

When a pre-coat of filter aid or carbon is required the pre-coat material may be mixed in any available drum. With the filter unit in the pre-coat mixture the pump draws the mixture through the filter and deposits the coat on the filter bag. When the desired amount of cake has formed on the filter bag, both filter and discharge hose are transferred to the plating tank without stopping the pump.

Filter bags of Dynel, Vinyon, Nylon or cotton twill can be furnished when specified. These bags require pre-coating as described above. To clean, they may be washed in another drum or set in a drain and the old cake flushed off with hose.

**Saves major share of conventional filter costs.** You buy only the filter unit — save the cost of filter tank, filter unit assembly, piping, etc.

**Saves installation expense.** You just hang the filter in the plating tank and plug in the motor.

**Saves space.** Only the pump and hose occupy space outside the plating tank.

**Saves cleaning time.** No time consuming tear down, reassembly and lockup of filter units.

**Saves cost of slurry tank.** Any available drum can be used for precoating.

**Permits visual inspection of pre-coat.** Just lift the filter unit out of the mixture and inspect the cake at any time.

**Avoids Filter capacity problems.** You don't need to worry about future requirements with BELKE In-the-tank filters. You can add more units or transfer unneeded filters to other tanks.

**Built for long service.** The Plexiglas filter plate is practically ageless under temperatures up to 180°F.

**BELKE In-the-tank Filters can be furnished for practically all types of acid or alkaline plating solutions. *In ordering or requesting quotation please specify the type of solution to be filtered.***

Belke MANUFACTURING COMPANY
947 N. Cicero Ave., Chicago 51, Ill.
EVERYTHING FOR PLATING PLANTS

**For more data circle 383 on Postpaid Card**

spray from reaching masked areas.

The guns spray down and exhaust air is drawn down, so that overspray is not directed toward the operator's face while the outside edges of a part are being sprayed.

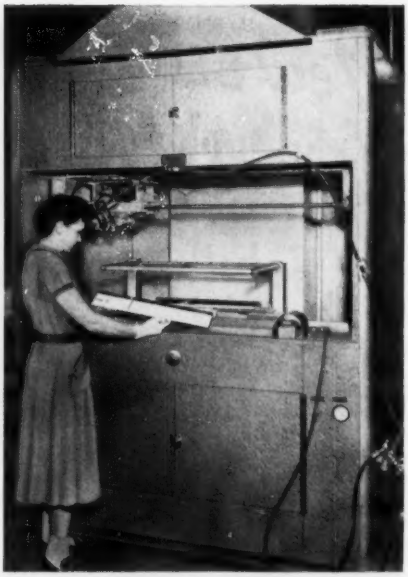
The spray guns tilt during the cycle to paint the ends of shaped objects in the same stroke that paints the tops and sides. Guns are adjustable for painting smaller parts.

The machine always completes its stroke. Number of stroke is adjustable.

*Typical Applications:* Large parts, such as refrigerator evaporator doors, shelves, trays, air conditioner panels; smaller parts such as nameplates, escutheons, toys and novelties can be painted singly or several at a time.

*Manufacturer:* Finish Engineering Co., Inc., Erie, Pa.

For more data circle **22** on Reader Service Card



*Model 4800 Spray-Decorating Machine*


THESE AND OTHER COATINGS

WILL STRIP IN MINUTES . . .

OFTEN SECONDS

Let us solve your PAINT STRIPPING problem with a TIME SAVING answer to reclaim reject parts, carrying conveyances, etc., in a manual or conveyorized operation.

NON-FLAMMABLE

Electro Cold Stripper

COMPLETE DATA AND TESTING SAMPLE AVAILABLE — GRATIS.

ALLIED FINISHING SPECIALTIES CO.

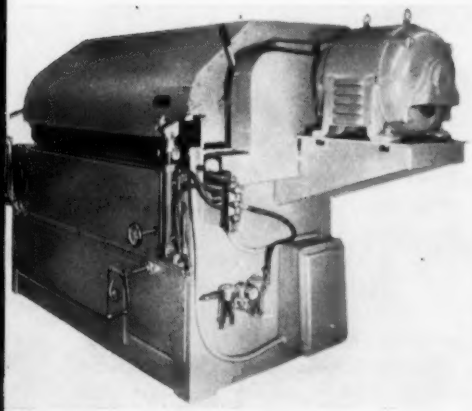
2643 W. GRAND AVENUE • CHICAGO 12, ILLINOIS • PHONE: AR 6-2222

For more data circle 384 on Postpaid Card

## Heavy-Duty Sander

*Description:* An abrasive belt sander recently introduced by Timesaver Sanders is suitable for heavy-duty, high-speed operations. Automatic air jet abrasive belt tracking permits accurate control of heavy work at high speeds. Special conveyor belt and roller feed assemblies are available.

These machines are built in 24- and



*Timesaver Sander: heavy duty, high speed*

54-inch belt widths. Two basic models provide for top or bottom sanding of the work or for use in tandem in doing both operations at the same time.

*Manufacturer:* Timesaver Sanders, P. O. Box 7446, Robbinsdale Station, Minneapolis 22, Minn.

For more data circle **23** on Reader Service Card

★ ★ ★

## Barrel Finishing Rust Preventive

*Description:* An alkaline compound recently introduced by Roto-Finish Co. neutralizes acids left on work during barrel finishing cycles performed to remove heat treat scale, and at the same time leaves a film that prevents corrosion during storage.

This rust preventive is referred to as 117-C. It is completely soluble, leaves no insoluble residue on surfaces, slots or recesses of parts.

The compound also acts as a deburring aid when used with the proper grinding media. It aids in brightening steel parts.

The manufacturer recommends that the compound be used at a concentration of ½ to one pound per 100 pounds of chips, with the water level even with the mass.

*Manufacturer:* Roto-Finish Co., 3704 Milham Rd., Kalamazoo, Mich.

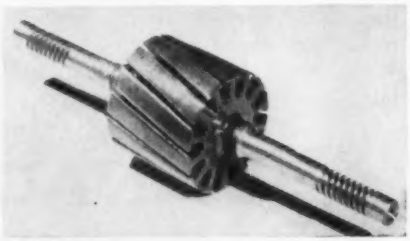
For more data circle **24** on Reader Service Card

★ ★ ★

## Epoxy Coating Powders

*Description:* Epoxy coating powders for use with the Whirlclad Process make it possible to produce epoxy coatings 0.004 to 0.025 inch thick in a single dip, the manufacturer states.

The Whirclad Process is a method of applying various coatings by dipping in a fluidized bed of the coating material. Parts to be finished are pre-



*This part has been coated with a heavy, uniform film of nylon by the Whirlclad process*

heated and dipped into a bed of dry powders, which bond by fusion onto the surface of the parts.

Applicators use the process under a licensing arrangement.

*Manufacturer:* National Polymer Products, Inc., 125 N. Fourth St., Reading, Pa.

For more data circle **25** on Reader Service Card

# Cuneo Press finds "Plus-4" Copper Anodes keep working until they're "so thin that they almost float"

In the big, busy rotogravure cylinder plating room of The Cuneo Press, Inc., Chicago, the acid-copper tanks are operating 24 hours a day.

Supplying precision cylinders to meet weekly deadlines in printing some 13 million copies of weekly magazines and pictorial sections for newspapers calls for maximum reliability and efficiency in every phase of the operation.

Late in 1954, Cuneo first tried "Plus-4" Anodes, Anaconda's phosphorized copper anodes. After more than three years of experience, they report the following advantages:

**1.** Solution is more easily maintained and balanced—with considerable saving in solution dumped and acid added.

**2.** Practically no sludge—tanks are drained only half as often as with ordinary anodes.

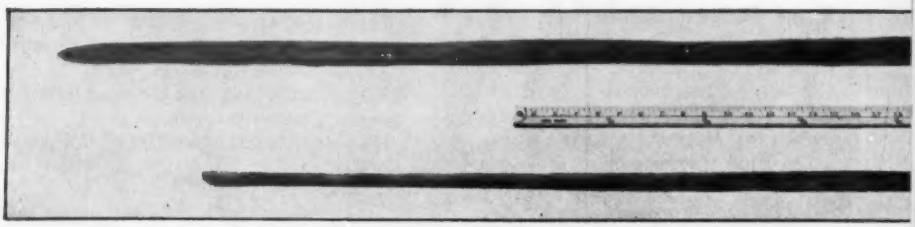
**3.** 15 per cent more usable copper. "Plus-4's" corrode so evenly (see below) that only slender ribbons remain. Though these do not actually float, they become so light that they no longer maintain proper contact with the anode cradle.

**Write for information** on how you can obtain a test quantity to supply one tank. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 58137

# ANACONDA®

## "PLUS-4"® ANODES Phosphorized Copper

MADE BY THE AMERICAN BRASS COMPANY



Putting finishing touches on a copper cylinder for one of the weekly newspaper rotogravure sections shown in the background. *Below:* Typical "fish" from Cuneo's tanks. The top one is 80" long, weighs 2 lb. 3 oz.—original 85-lb. anode was 1" x 3" x 88½". Lower "fish" is 71" long, weighs 1 lb. 4 oz.—original 74-lb. anode was 1" x 3" x 76".

For more data circle 385 on Postpaid Card

# News of the Finishing Industry

✓company news
✓new positions
✓new plants
✓meetings

## NEW PLANTS

### Pennsalt Chemicals Will Move Corrosion Engineering Activities to Natrona Plant

Pennsalt Chemicals Corporation will move the sales department and research and development activities of the Corrosion Engineering Department to its Natrona, Pa. plant in September.

Manufacturing, sales, and development activities will all be centered in Natrona under the direction of Robert R. Pierce, currently manager of Corrosion Engineering.

## COMPANIES

### Norcross to Display Viscometers at Instrument-Automation Conference

Norcross Corporation, Newton, Mass., will exhibit recording and controlling viscometers at the 13th Annual Instrument-Automation Conference and Exhibit, to be held in Philadelphia, Pa., September 15-19.

The Norcross exhibit in Booth 1524 will feature equipment for viscosity recording and control in various industries. Information will be available on solvent control systems that automatically add solvent to correct for evaporation losses in flow coating, dipping, spraying, wire coating and rotogravure printing operations.

Personnel from the company to be on hand at the show: Austin S. Norcross, Robert A. Norcross and Robert S. Davis, Jr.

### Pressure Blast Manufacturing Acquires Cro-Plate

Pressure Blast Manufacturing Co., Inc., Manchester, Connecticut, has acquired assets and manufacturing rights of the former Cro-Plate Co. of Hartford, Connecticut.

The entire line of Pressure Blast Wet Blasting equipment and abrasives is being continued. Manufacturing and sales offices have been moved to Manchester.

### Narda Ultrasonics Begins Mass Production

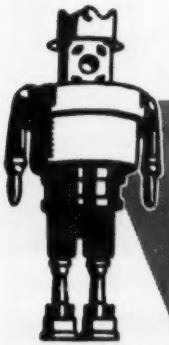
Narda Ultrasonics Corporation, Westbury, N. Y., manufacturer of ultrasonic cleaning and processing equipment has recently begun producing its ultrasonic equipment on assembly lines, according to John C. McGregor, Narda president.

Narda, now less than a year old, has grown rapidly with the expanding ultrasonics industry. The company is operating at a 1½-million-dollar annual sales rate, has 55 employees, 30,000 square feet of floor space, 50-foot-long assembly lines turning out "modular" ultrasonic systems.

Generators are identical for all models of the same series. Transducer modules are the same throughout all models of the series. As more power and more transducers are required for larger tanks, the *number* of modules is increased. The same is true of tanks and generator cabinets.

## *Another plating problem solved by Sel-Rex*

# "SEL-REX GOLD PLATE ELIMINATED GALLING, INCREASED RESISTANCE TO WEAR OF OUR CONNECTORS."



**Cinch**
ELECTRONIC COMPONENTS

**THE PROPOSITION:** Research proved that *some* of the metallurgical properties of Gold would improve performance and reliability of new Cinch Connectors.

**THE PROBLEM:** Ordinary Gold plate's softness makes it susceptible to galling. And, because it is so soft and relatively porous, it wears readily exposing vital contact points to abrasive damage, corrosion — early failure.

**THE SOLUTION:** After extensive investigation, Cinch installed Sel-Rex Bright Gold because this patented formulation produces electroplate which is:
1) ...twice as hard (115 Vickers, as compared to 65) and has demonstrated 40% greater resistance to wear and abrasion.
2) ...far more dense — accelerated corrosion tests prove Sel-Rex Bright Gold plate gives many times more protection with a fraction of the Gold.
3) ...mirror-bright in any thickness, directly from the bath — no scratch brushing or burnishing. Eliminating such costly post-plating operations makes *net costs* lower too.

Exclusive Sel-Rex Plating Processes retain the desirable properties of the precious metals — eliminate the problems.

Whatever your plating problems — precious metals, power, equipment or procedures — Sel-Rex representatives are trained to engineer solutions to our mutual profit. Send for FREE technical literature and other case histories and see for yourself... we may have solved your problems last month.

*Front and rear view of 50 contact socket D sub-miniature series with floating mounting holes.*

*15 contact plug and socket D sub-miniature series.*

*23 contact plug and socket DPX series.*

**Sel-Rex®** **SEL-REX CORPORATION**
NUTLEY 10, NEW JERSEY

*Manufacturers of Exclusive Precious Metals Processes, Metallic Power Rectifiers, Airborne Power Equipment, Liquid Clarification Filters, Metal Finishing Equipment and Supplies*

**For more data circle 386 on Postpaid Card**

## Amchem Granted Patent for Zirconium Coating

Amchem Products, Inc., (formerly American Chemical Paint Company), Ambler, Pa., has been granted U. S. Patent No. 2,836,525, which deals with the coating of zirconium and its alloys.

The fundamentals of this patent have been and are being utilized commercially to produce a chemical conversion coating which facilitates the drawing of zirconium tube and shapes. The chemical process being marketed by Amchem is known as Granodraw ZR. This process has been vital in the successful drawing of zirconium tubing for nuclear reactors.

## Techline Is Name of New Wheelabrator Division

Lee D. Stevens

The new division of Wheelabrator Corporation, Mishawaka, Indiana, formed as the result of acquiring the former Crandall Engineering and Manufacturing, Inc., of Vicksburg, Michigan, will be known as the Techline Division, according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**Silk, Nylon or Metal Cloth**

- Prompt Delivery anywhere in U. S.
- Absolutely TAUT screens for perfect registry to last impression of run.
- Perfect reproduction of your black and white drawing.
- Prepared by experienced technicians.

**PERFECT FOR**

TV SETS NAME PLATES TOYS DIALS
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**Use NAZ-DAR Weatherproof Silk Screen Enamel**

Uniformly high opacity

Write today for screen and ink information, Dept. P-6.

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inks • varnishes • lacquers • silks
screen plates • squeegees • films

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*designed and built for every product and process requirement*

**Batch and Conveyor types up to 1000° F.**

*Write for Bulletin 157*

**YOUNG BROTHERS CO.** 1830 Columbus Road Cleveland 13, Ohio

*Over 60 years of service*

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## *Plan NOW to Attend...*

# Fifth Industrial Finishing Exposition

**June 15 to 19, 1959**

**Detroit Artillery Armory, Detroit, Michigan**

Exhibits will feature latest developments in processes, machinery and materials for the electroplating and finishing industry — the largest show of its kind ever held.

The Fifth Industrial Finishing Exposition is being held in conjunction with the Golden Jubilee Convention of the American Electroplaters' Society, and the Fifth International Conference on Electrodeposition and Metal Finishing.

**Information on the Fifth Industrial Finishing Exposition is available from Howard J. McAleer, exposition chairman, 3171 Bellevue, Detroit 7, Michigan.**

George H. Lieser

Roy T. Romine

to Jacob A. Schmidt, Jr., secretary-treasurer of Wheelabrator and general manager of the Techline Division.

The new division, with headquarters at Vicksburg, will manufacture and sell barrel finishing machines and wet blast equipment.

George H. Lieser, who has been department head of the Liquamatte line of wet blast equipment at Wheelabrator the last eight years, will be field sales manager of the new division; Roy Romine, who founded Crandall Engineering in 1957, will be chief engineer, and Lee Stevens will be director of process engineering.

Reporting that the new division is seeking manufacturers' agents or distributors in key market areas, Mr. Schmidt asserted, "We believe our division will be able to build a strong sales and service organization because it brings together barrel finishing equipment, media and compounds with liquid blasting equipment and abrasives. In many instances, these two processes complement each other, and having both types of equipment will put our division and its sales force in a strong position."

## Enthone Holds Sales Conference

Enthone, Inc., Subsidiary of American Smelting and Refining Company,


WOOD TANKS
FOR PLATING AND PICKLING

• Give us your requirements . . . we'll build it from the finest woods, to fit your needs *exactly!*

*Send for details.*

WOOD TANK DIVISION

Kalamazoo TANK & SILO CO.

1571 Harrison Street, Kalamazoo, Michigan

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NOW! 'job-specified'
Sethco filters
to 'match' your needs

50-3000 gals./hr. cap.

over 25 basic models . . . each available with specified components and materials of construction for every solution filtering application.

Model LSIN series

WRITE for Illustrated Fact Folder

Sethco Mfg. Co.

2292 Babylon Turnpike, Merrick, L. I., N. Y.

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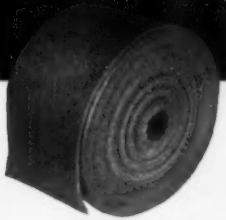
# For Dust Free Finishes!
# BOND TACK CLOTH



**IN ROLLS**
Cut off any size piece to use as needed.

**IN BULK**
Cut and folded. Ready to use.

## STAYS SOFT AND TACKY — A SPECK-FREE FINISH EVERY TIME

**Now Available In Rolls or Cut Bulk—White or Gold**
**In Four Different Types of Cloth**

Get your Tack Cloth packed just the way it's easiest for you to use . . . either in 150 yard rolls of 36" wide cloth or in handy cartons . . . 100 or more Tack Cloths to the carton.

No matter which way you buy it, you can be sure that every square inch will stay SOFT and TACKY until the very last bit is used up! Choice of Standard, Extra Tacky or Less Tacky, as desired.

The Cut Bulk size is 18" x 36" . . . folded to 4½" x 18" or 9" x 18" for ease of handling. ALL BOND TACK CLOTH is *Spontaneous Combustion Proof, Lint-Free and Wax-Free.* Gives a sparkling speck-free Finish every time. Clean and Sanitary. No waste.

*TRY THEM and COMPARE RESULTS. Samples Gladly Sent Upon Request.*

*"The Tacky Wiper Specialists"*

**Bond® CHEMICAL PRODUCTS CO.**

**2639 N. CLYBOURN AVE. CHICAGO 14, ILLINOIS**

ALSO INDIVIDUALLY PACKED IN GLASSINE ENVELOPES —144 to the Carton

**A WARRANTY OF SATISFACTION IN EVERY CARTON**

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# Rhodium ELECTROPLATING SOLUTIONS

Technological knowledge acquired through many years of experience, plus special processes and equipment, assure the high quality of our Rhodium Plating Solutions.

Recommended for contact surfaces of switches, waveguide parts and other electrical applications, such as printed circuits...Can be applied in extremely heavy deposits, up to 100 milligrams per square inch.

Rhodium plating provides the advantages of whiteness, lustre and corrosion resistance of a precious metal.

*Consult our staff about plating problems.*

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**SIGMUND COHN MFG. CO., INC.**

121 SOUTH COLUMBUS AVENUE • MOUNT VERNON, NEW YORK

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*Enthone's management personnel and sales engineers at recent sales conference: (front row, left to right) F. A. Schneiders, R. B. Goodsell, L. J. Durney, D. S. Hartshorn, J. E. Rhoads, J. R. Eisele, W. K. Murray, L. V. Gagnon, E. B. Washburn; (back row, left to right) P. L. Veit, A. F. Fletcher, A. H. Sanders, A. R. Tefft, H. M. Goldman, Dr. A. J. Phillips, Director of Research, Asarco, Dr. W. R. Meyer, president, L. J. Molnar, C. C. Helmle, vice president, sales, A. J. Kolb, J. H. Shockcor, D. F. Seymour, L. H. Butcher Co., C. Schaefer.*

recently held its semi-annual sales conference at the home office in New Haven, Connecticut. New Enthone developments in finishing chemicals and equipment were introduced to the sales engineers by Dr. Walter R. Meyer, president.

The theme of the meeting was "Creative Selling," stressing the imaginative application of Enthone prod-


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Contains all types of degreasers: Laboratory, Two-Dip, Three-Dip, Vapor Spray, Barrel Type, Automatic, Semi-Automatic, Driers, Stills and Specials.
When the job needs a degreaser . . . there's a D'OILER for the job.

**mechanical process co., inc.**
392 VALLEY ST. • SOUTH ORANGE, N. J.

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**WHY**
**DO YOU ALLOW RAPID WEAR ON YOUR BUFFING FIXTURES**

when they can be *FUSECOATED* to last up to a year or more? We specialize in protective coatings for fixtures of all kinds and would like to add your name to our long list of regular customers.

*Write*

for our general information folder or send sample fixture or drawing of same to be FUSECOATED.

**Fusion Metal Coating Co.**
**25493 West 8 Mile Road**
**Detroit 19, Mich.**

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# STUTZ

**BALL ANODE CONTAINER**
**NEW CONSTRUCTION**
**FOR LONG SERVICE**

STUTZ CONSTRUCTION — Heavy gauge steel with wire woven through steel angle firmly attached to main stem. Cannot come apart or loosen. Side clip is for STUTZ BARREL PLATING TANKS having submerged rectangular anode bars. Side clip not furnished for racked plating tanks. Standard hook 6 inches. Other hook lengths furnished in quantity of 100 or more.

WELDED CONSTRUCTION — Note how welds have dissolved or broken in use. Often caused in barrel plating where currents are high and barrel transfer is rapid.

**PRICES—11 cents per inch for basket lengths 18 inches or longer. Increments 3 inches. Curved containers only for 14" and 16" diameter barrels 15 cents per basket additional.**

*Serving Industry 35 Years*

## THE STUTZ CO.

4410 Carroll Ave., Chicago 24, Ill.

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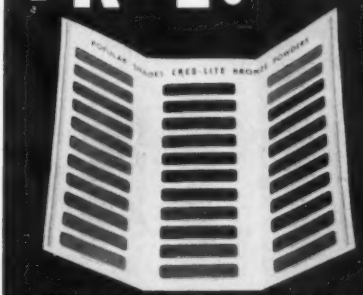
# FREE! NEW COLOR CARD



FULL RANGE OF 33 COLORS
FOR IMMEDIATE DELIVERY

**CRES-LITE**

*Pure Metallic*

# BRONZE POWDERS

Unequalled for smoother, more brilliant Plated-Effect Finishes —by spray, dip or flow coating.

**IN STOCK**—tremendous selection of colors including popular *metallic pastels.*

**COLORS MATCHED**—with no variance in quality, color, or lustre from batch to batch. Fast service guaranteed.

**SPECIAL COLORS**—Over 25 years experience in creating special colors and shades for the plastic and metal finishing trades, on request. Satisfaction assured.

*Write for Free Color Card of in-stock Cres-Lite Bronze Powders*

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118 W. ILLINOIS STREET, CHICAGO 10
1841 S. Flower St., Los Angeles 15

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ucts to new uses. C. C. Helmle, vice president for sales, presided at the four-day conference.

### Smith & Purdy to Represent Acoustica Associates in New England

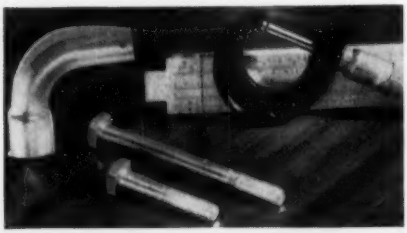
Smith & Purdy Associates, Needham Heights 94, Mass., has been appointed exclusive New England representatives for Acoustica Associates, Inc., Long Island, New York, manufacturer of ultrasonic cleaning and degreasing equipment.

### Hanson-Van Winkle-Munning To Broaden Rectifier Line

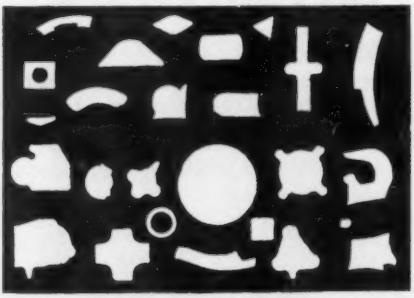
Hanson-Van Winkle-Munning Company has announced a stepped-up development program intended to broaden the company's market for rectifiers.

H-VW-M specializes in low-voltage rectifiers for the electroplating industry. With a recently expanded rectifier department the Matawan, N. J., firm will develop equipment for electrochemical and electrometallurgical processing, utility power conversion, shop power supply, special laboratory supply, motor generator field excitation, high-voltage hard anodizing and other industrial d.c. applications.

★ ★ ★



*These parts were plated by an immersion nickel plating process in the Pierce Precision Plating Company's shop, San Carlos, Calif. Process produced uniform plates on all of the surfaces, including interior of the cutaway pipe section shown here, threaded parts.*

**Pre-Cut Masks Speed Finishing**

Brady Pre-Cut Masks are self-sticking — go on fast and accurately. Protect from finishing to inspection. Hundreds of shapes and sizes in stock, for paint spraying, baking, tumbling, etc. Specials made to order. Fast delivery. Distributors in 150 cities.

Write for free samples and Bulletin 160-C.

W. H. Brady Co.

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*ALL TITANIUM*

**ANODIZING CYLINDER**

For bulk processing of screws, bolts, rivets, etc.

Made entirely of Pure Titanium to resist the effect of all acids used in processing.

(Shipped from stock)

**Price—Lots of 3—$65.00 ea.**

Single unit $67.50

**DETROIT INDUSTRIAL PROCESS COMPANY**

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**PIONEER IN**

# CHROMATES

**NOW OFFERS DECORATIVE**

# COLOR

**ON ECONOMICAL**

# ZINC

At long last you can now secure beautifully bright, gleaming colors from a simple LUSTER-ON chromate dip process for your zinc plated small parts.

These are not just spotty identification colors. These are scintillating golds, yellows, blues, greens, violets, reds, brass and copper hues that will add glamor and sales appeal.

***Especially Brilliant on Wire Goods***

Be the first in your field to offer this sales booster. Write or wire today for the full story on low-cost LUSTER-ON COLOR.

**Samples Gladly Processed Free**

**West Coast:** Crown. Chem. & Engr.
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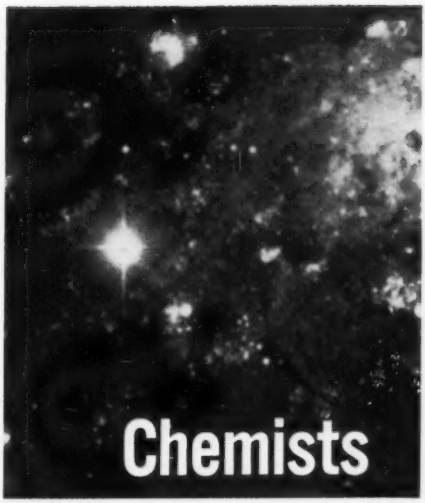


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Boeing has rewarding research openings in the area of inorganic finishes, for chemists or chemical engineers experienced in electroplating and anodic finishing. The work deals with research studies on the effects of process variables upon structural properties of the base metals and development of new plating techniques. Experience in electrochemistry is desirable but not essential.

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## Chemray Corporation Formed

R. F. Ledford

Raymond F. Ledford, formerly director of sales and research at Industrial Filter & Pump Manufacturing Co., has formed a new company, Chemray Corporation. The new company, located at 10052 Roosevelt Rd., Westchester, Ill., will represent finishing equipment and materials manufacturers, including Frederic B. Stevens, Inc., Sel-Rex Corp., Divine Brothers Co., Promat Div., Poor & Co., and Electrochemical Products Co.

Mr. Ledford is first vice president of the Metal Finishing Suppliers' Association, Inc., and has been active in the American Electroplaters' Society for many years.

## NEW POSITIONS

**William A. Baltzell,** formerly assistant sales manager, has been appointed industrial sales manager for **Oakite Products, Inc.,** New York manufacturer of industrial cleaning and metal treating materials.

★ ★ ★

**John E. Lowe,** assistant industrial sales manager in the **Du Pont Company's** industrial finishes regional sales office in Chicago, has been transferred to Atlanta as regional industrial sales manager. Mr. Lowe replaces **J. T. Geoghegan** who has joined **Du Pont of Canada.**

★ ★ ★

**R. L. Clement** has been appointed Detroit district manager and **Danforth & Cunningham** Buffalo district representative by **The W. W. Sly Manufacturing Co.,** Cleveland, Ohio, manufacturer of dust control systems, industrial ovens, blast cleaning equipment and tumbling mills.


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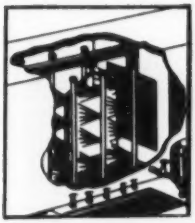

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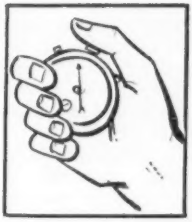
Strips Baked Alkyds in Minutes



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- Single addition agent
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*Used successfully by job platers and manufacturers*

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Boosts Production
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**Magnuson Products Corporation** has appointed **Clifford Oates** sales representative in Connecticut for the company's line of cleaning compounds.

★ ★ ★

**John E. Knight** has been named north central area sales representative for the Industrial Products Division of **The Pioneer Rubber Company,** Willard, Ohio, maker of industrial gloves.

Mr. Knight's territory will include Illinois, Indiana, Iowa, Kentucky, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, Wisconsin.

★ ★ ★

**Clyde C. Ruddick** has been appointed manager of safety, health and plant protection for **Pittsburgh Plate Glass Company.** Mr. Ruddick succeeds the late Thomas R. Donoghue, holder of this position since 1946.


**IMPORTANT ANNOUNCEMENT!**

Effective August 10, 1958, the JOSEPH B. KUSHNER ELECTROPLATING SCHOOL will be located at new quarters in EVANSVILLE, INDIANA. Our new address will be **JOSEPH B. KUSHNER ELECTROPLATING SCHOOL, 2509 WASHINGTON AVE., EVANSVILLE 14, INDIANA.** From these new and larger quarters we will continue to service the metal finishing industry with our world famous ELECTROPLATING KNOW HOW Course, engineering counsel and testing instruments. Thank you for your continuing patronage. Dr. Joseph B. Kushner, Stroudsburg, Pa.

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**Sid Mitwol** has been promoted to general manager of the Rectifier Division, **Sel-Rex Corporation,** Nutley, N. J. In his new position, Mr. Mitwol will be responsible for all the activities of the division: sales, manufacturing, new product development.

*Sid Mitwol*

*Charles L. Long*

**Charles L. Long** has been appointed head of the Project Engineering Department of **Chainveyor Corporation,** manufacturer of overhead conveyor equipment. Mr. Long will make his headquarters at the general offices in Los Angeles, where he has been factory manager for two years.

★ ★ ★

**Paul Harper** has been appointed west coast representative for **Sel-Rex Corporation,** Nutley, New Jersey manufacturer of precious metals plating


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compositions, rectifiers, solution filters, finishing equipment, supplies.

In his new post, Mr. Harper will be responsible for sales and technical service in California, Oregon, Washington, New Mexico, Nevada, Texas, Utah, Arizona and Colorado.

*Paul Harper*

*Don Volino*

**Don Volino** has been appointed eastern division sales manager for the **Maas & Waldstein Co.**, Newark, New Jersey, manufacturer of industrial product finishes.

★ ★ ★

**Hjalmar A. Anderson** has been appointed chief engineer for **Burdett Manufacturing Co.**, Chicago manufacturer of industrial ovens and radiant heat combustion systems.

Mr. Anderson was formerly assistant chief engineer of Electric Furnace Division, Sunbeam Corporation.

*H. A. Anderson*

*Daniel H. Ross*

**MacDermid Incorporated,** Waterbury, Connecticut, recently appointed **Daniel H. Ross** sales trainee. Mr. Ross will receive training in the company's laboratory, then will be assigned to work with a MacDermid representative for additional training in the field.


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**William J. Hennessy** has been appointed national product development manager for **Kelite Corporation,** manufacturer of industrial chemicals for cleaning and metal finishing, and steam cleaning equipment.

*W. J. Hennessy*

*Darwin Chester*

**Darwin Chester** has been appointed sales engineer for **Frederic B. Stevens,**

## *A Survey of Paint Application Methods*

**A series of articles** on painting methods have been reprinted as a 64-page booklet.

Chapters in the report cover: 1) Use of the Spray Gun. 2) Conveyorized Spray Finishing; Automatic Spraying; Electrostatic Spray Painting. 3) Hot Spray; Airless Spraying; Steam Spray Painting; Spraying Catalyst Coatings. 4) Dipping Methods; Flow Coating. 5) Roller Coating; Tumble and Centrifugal Painting; Silk Screening; Aerosol Painting.

Reprints of *A Survey of Paint Application Methods* are available at 50 cents a copy. Write to PRODUCTS FINISHING, 431 Main St., Cincinnati 2, Ohio.


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**Inc.** Mr. Chester, a service engineer for Stevens since 1957, will cover certain areas of Michigan and Ohio.

★ ★ ★

The board of directors of **Atlas Powder Company** has announced several major changes among top-level personnel, including the election of Atlas president **Ralph K. Gottshall** as chairman of the board, in addition to re-election as president. As chairman of the board, he succeeds **Isaac Fogg,** who retired after nearly 46 years of service. Mr. Fogg will remain as a director, member of the finance committee and chairman of the committee on audit.

The board also announced the election of **Edward J. Goett,** senior vice president, to the position of executive vice president.

Other changes announced included: **Edward J. Massaglia,** general manager for operations of the chemicals division, elected vice president and general manager of the newly-consolidated chemicals division.

**Robert J. Reilly,** assistant treasurer, elected treasurer and secretary, succeeding **Preston W. Parvis,** who also retired after more than 47 years of service. Mr. Parvis remains a member of the board and was appointed a member of the committee on audit.

**John H. Leary,** assistant to the president, elected assistant treasurer and assistant secretary.

**Norman E. Miller,** company controller, elected an officer.

Officers re-elected were Vice Presidents **James R. Frorer, Charles C. Gammons,** and **William C. Lytle**; and **Arnold J. Fiedler,** assistant treasurer and assistant secretary.

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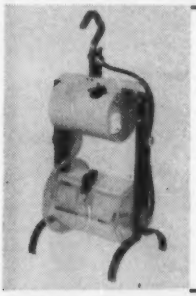
## TRAINING COURSES

### Binks Adds Electrostatic Painting to School Curriculum

Binks Manufacturing Company has added instruction in electrostatic spray finishing to its course in spray painting, the company announced recently.

In the electrostatic course students will set up and operate an electrostatic system. They will learn power requirements for such a system, optimum air and material pressures, gun positions and what products are best suited for electrostatic finishing.

The Binks spray painting school

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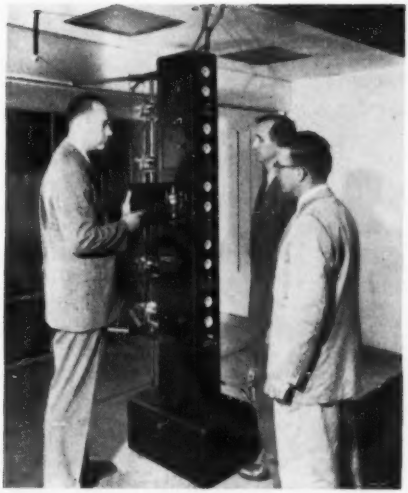

*William R. Brooks, chief instructor at the Binks Manufacturing Company's spray painting school, explains technique of electrostatic spray painting method to his students.*

fall schedule includes a session for industrial jobbers in September and open sessions October 6-10, November 3-7 and December 8-12. The school is open on a tuition-free basis to people in the finishing industry.

In addition to the new electrostatic course, students receive instruction in operating and servicing spray guns, paint circulating systems, material handling pumps, oil and water ex-


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tractors, flocking equipment, compressors, spray booths and automatic equipment.

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## SOCIETIES

### Federation of Paint and Varnish Production Clubs to Hold 36th Annual Meeting, 23rd Paint Industries Show

Cleveland Public Auditorium will be the site for the 36th Annual Meeting of the F.P.V.P.C. and the 23rd Annual Paint Industries' Show, both of which will be held concurrently on October 5-8.

The registration and information center for the convention will open at 8 A.M. Monday, October 6, and at 9 A.M. October 7 and 8.

Technical sessions will be held on all three days, at the auditorium. The program will include keynote address, the Joseph J. Mattiello Memorial Lecture, panel discussions, Constituent Club Technical Committtee papers, and research and educational reports.

The Paint Industries Show will feature displays of materials and machinery by suppliers of the paint industry.

Dr. Eugene G. Rochow, professor of inorganic chemistry at Harvard University, will present the 1958 Mattiello Lecture, "In Pursuit of An Ideal." The Mattiello Lecture, instituted by the Federation in 1949, commemorates the name of Dr. Joseph J. Mattiello, who, as a member of the Federation, did so much to expand the application of science in the protective coatings field. Dr. Rochow is the tenth outstanding scientist to receive the paint industry's highest honor—selection as a Mattiello Lecturer.

Keynote address will be by Dr. Lincoln R. Thiesmeyer, president of the Pulp and Paper Research Institute of Canada and associate professor of geology at the Illinois Institute of Technology. Dr. Thiesmeyer's topic will be *Indians, Ingenuity and Insurance.*

The Annual Banquet, Entertainment and Dance will be held on Tuesday, October 7, at the Hotel Carter.


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## Photonews of Detroit-Branch A. E. S. Annual Stag Day

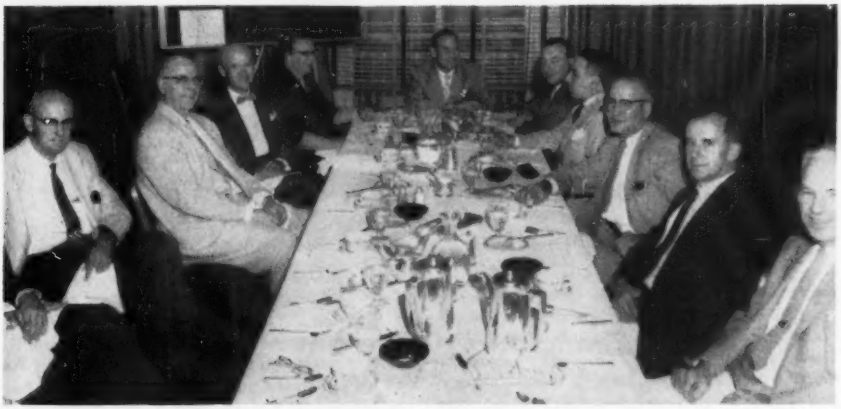

*Fig. 1—Detroit Branch officials met on July 25 to review plans for the 1959 Industrial Finishing Exposition. Shown (left to right) are: Marvin C. Johnson, Geo. P. Johnson Co., Exposition manager; H. E. Head, Chrysler Corp., A. E. S. president; R. C. Trees, Udylite Corp., Convention Publicity chairman; Gene Schroeder, Formax Mfg. Corp.; Howard J. McAleer, Formax Mfg. Corp., Exposition chairman; Manuel Ben, General Motors Corporation Research Staff, Detroit Branch president and Exposition co-chairman; John P. Nichols, A. E. S. executive secretary; Chester G. Borlet, Grand Rapids Brass Company, A. E. S. 3rd vice president; Dr. George Dubpernell, Metal & Thermit Corporation; and Wright Wilson, Chrysler Corporation, who is Convention general chairman.*

*Fig. 2—Detroit Branch Annual Stag Day Committee (and guests) shown at lunch at Hillcrest Country Club on July 26. At head of the table (left to right) are: Robert A. Spaulding, General Motors Corp., sports program chairman; Manual Ben, General Motors Research Staff, Detroit Branch president; Walter L. Pinner, Houdaille Industries, Inc., golf chairman; John P. Nichols, A. E. S. executive secretary; John F. Siefen, Siefen Compounds, Inc., Stag Day chairman; H. E. Head, Chrysler Corp., A. E. S. president; Wright Wilson, Chrysler Corp., 1959 convention chairman; Ezra A. Blount, editor of PRODUCTS FINISHING; John B. Hitchcock, E. I. du Pont de Nemours & Co., Stag Day ticket chairman. General Chairman John Siefen reported an attendance nearing 1,000.*

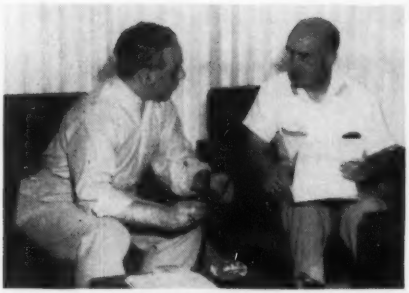

*Fig. 3—Walter L. Pinner (right) took time off from golf to confer with John P. Nichols, A. E. S. executive secretary on the educational program for the 1959 Golden Jubilee Convention of the A. E. S., which is to be held in conjunction with the Fifth International Conference on Electrodeposition and the Fifth Industrial Finishing Exposition.*

*Fig. 4—Out-of-town visitors to the Detroit Branch Annual Stag Day included Ellsworth T. Candee (left), secretary of the Lea Manufacturing Company, Waterbury, Conn., and A. E. S. past president, seen here at the first tee of the Hillcrest Country Club with Manual Ben of the Detroit Branch, who is vice chairman of the Fifth Industrial Finishing Exposition.*

*Fig. 5—Val Jones (right), Dumatic Devices, Inc., directs the Putt-Luck contest at the Stag Day. Hillcrest Country Club in background carries banner publicizing the A. E. S. Golden Anniversary convention to be held June 14 to 19, 1959, in the Detroit Artillery Armory.*

*Fig. 6 — Platers showed strength in Tug-O-War contest supervised by J. D. Johnson, Frederic B. Stevens, Inc., and C. E. Campbell. (Photographs by PRODUCTS FINISHING)*

## NECROLOGY

### Lee M. Porter

Lee M. Porter, Boston regional trade sales manager of the Du Pont Company's Finishes Division, died August 5 at his home in Wellesley, Mass. He was 50 years old.

### Sigmund Fabry

Sigmund Fabry, mechanical engineer with Belke Manufacturing Company for 31 years, died June 18 in Chicago.

### Kenneth C. Brownell

Kenneth Cooke Brownell, 55, chairman of the board of American Smelting and Refining Company and a leading United States industrialist, died August 4 at Columbia Presbyterian Medical Center.

Mr. Brownell joined American Smelting and Refining Company in 1927 and came up through the ore purchasing and sales departments to vice president in 1936, executive vice president in 1947 and president in 1949. He was elected board chairman and chief executive officer in April, 1957.

## MEETINGS of INTEREST to FINISHERS

**Sept. 7-12. 134th National Meeting, American Chemical Society,** Chicago, Illinois.

**September 28-October 2. Fall Meeting, The Electrochemical Society,** Chateau Laurier, Ottawa, Canada.

**Oct. 5-8. 36th Annual Meeting, Federation of Paint & Varnish Production Clubs,** Cleveland Public Auditorium, Cleveland, Ohio.


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**Oct. 5-8. 23rd Annual Paint Industries' Show,** Cleveland Public Auditorium, Cleveland, Ohio.

**Oct. 27-31. 40th National Metal Exposition and Congress,** Cleveland Public Auditorium, Cleveland, Ohio.

**Oct. 31-Nov. 1. Philadelphia Branch, A. E. S., Annual Educational Session and Banquet,** Hotel Sheraton, Philadelphia, Pa.

**Nov. 5-6. Fall Conference, Society of Vacuum Coaters,** Hotel Statler Hilton, Detroit, Mich.

**Dec. 4-5. Annual Educational Session and Banquet, Detroit Branch A. E. S.,** Hotel Statler, Detroit, Mich.

**Jan. 31, 1959. Annual Educational Session and Dinner Dance,** Cleveland Branch, A. E. S., Cleveland, Ohio.

**June 15-19, 1959. Golden Jubilee Convention and International Exposition, Fifth International Conference on Electrodeposition,** Detroit, Mich.

# PRODUCT LITERATURE

**40. Plating Barrels**
Literature describes company's line of plating barrels. Hardwood Line Mfg. Co., 2022 N. California Ave., Chicago 47, Ill.

**41. Cut Anode Waste**
Information on reducing waste of costly anodes by purifying plating baths with activated carbon so as to reduce rejects. Chemicals Div., Atlas Powder Co., Wilmington 99, Del.

**42. Pearlescent Finishes**
Information on Nacromer YNC, an additive that is used in standard organic finishes to produce a pearlescent finish. The Mearl Corporation, 124 E. 40th St., New York 16, N. Y.

**43. Preparing Aluminum for Plating**
Data on Alkalume Pre-Plate, a zincate bath used to prepare aluminum for plating. Northwest Chemical Co., 9310 Roselawn Ave., Detroit 4, Mich.

**44. Anode Hooks**
Information on PPI Uzall anode hooks. Plating Products, Inc., 1509 N. Washington, Kokomo, Indiana.

**45. Degreasers**
Bulletin OP2 gives complete information on the company's line of degreasers. Circo Equipment Co., 51 Terminal Ave., Clark (Rahway) N. J.

**46. Finishing Continuous Coil Stock**
Information on Clair Model 209 surface finishing machine, designed to be used in finishing coil stock and long sheets. Clair Manufacturing Co., Inc., Olean, New York.

**47. Spray Decorating**
Literature describes complete line of spray decorating machines and masks. Conforming Matrix Corp., 356 Toledo Factories Bldg., Toledo 2, Ohio.

**48. Clear Lacquer**
Information on Agateen No. 13C, a clear lacquer. Agate Lacquer Manufacturing Co., Inc., 11-13 43rd Rd., Long Island City, N. Y.

**49. Tank Lining**
Literature describes advantageous features of Amercoat PVC tank lining. Amercoat Corp., Dept. EG, 4809 Firestone Blvd., South Gate, Calif.

**50. Paint Stripper**
Brochure gives complete details on Epoxystrip, a paint stripper formulated to remove tough finishes easily. Beck Equipment Co., 3350 W. 137th St., Cleveland 11, Ohio.

**51. Plating Racks**
Illustrated bulletin on Thinker Boy plating racks, which are made of stock insulated parts that assemble with a leakproof seal. Belke Manufacturing Co., 947 N. Cicero Ave., Chicago 51, Ill.

**52. Ultrasonic Cleaning Equipment**
Complete data on Blakeslee ultrasonic equipment. Dept. 104-B, G. S. Blakeslee & Co., 1844 S. Laramie Ave., Chicago 50, Illinois.

**53. Motor Generators**
Booklet D-103 describes and illustrates complete line of modern low-voltage generators. Chandeysson Electric Co., 4074 Bingham Ave., St. Louis 16, Mo.

**54. Colored Zinc Chromates**
Details on colored chromate coatings for zinc. The Chemical Corp., 75 Waltham Ave., Springfield, Mass.

**55. Degreasing Solvent**
Information on Diamond perchlorethylene degreasing solvent, its advantages and properties. Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, Ohio.

**56. Buffs**
Information on Zip-Tip buffs for flat or irregular surfaces. Formax Mfg. Corp., Detroit 7, Mich.

**57. Metal Preparation Products**
Folder describes complete line of black oxide finishes, chromate finishes, cleaners, oils, strippers. Heatbath Corp., Springfield 1, Mass.

**58. Ovens**
Catalog No. 560 describes and illustrates a complete line of drying and baking ovens. The Lanly Co., 2800 Euclid Ave., Cleveland 15, Ohio.

**59. Electrocleaners**
Information on Magnus electrocleaning products. Magnus Chemical Co., Inc., 208 South Ave., Garfield, N. J.

**60. Degreasers**
Catalog describes laboratory, two-dip, three-dip, vapor-spray, barrel-type automatic, and semi-automatic degreasers. Mechanical Process Co., Inc., 392 Valley St., South Orange, N. J.

**61. Organic Finishing Systems**
Bulletin shows typical finishing systems, includes specifications for components. Michigan Oven Co., 431 Brainard, Detroit 1, Mich.

**62. Centrifugal Dryer**
Four-page folder gives complete details on the Model 20 New Holland Kreider centrifugal dryer. New Holland Machine Co., Dept. PF-0958, New Holland, Pa.

**63. Spray Nozzles**
Catalog 24 describes nozzles for washing, coating and rinsing applications. Spraying Systems Co., 3229 Randolph St., Bellwood, Ill.

**64. Coloring Compound**
Information on Stevens 27L liquid tripoli coloring compound, which helps to produce high color, is easily cleaned off before finishing. Frederic B. Stevens, Inc., 1800 Eighteenth St., Detroit 16, Mich.

**65. Baking and Drying Ovens**
Bulletin 157 describes batch and conveyor-type ovens for heating applications up to 1000 deg. F. Young Bros. Co., 1830 Columbus Rd., Cleveland 13, Ohio.

**66. Cold Stripper**
Literature sheet describes Electro Cold Stripper, a solution that can be sprayed, used for dipping, or brushed on to remove organic coatings. Allied Finishing Specialties Co., 2641 W. Grand Ave., Chicago 12, Ill.

**67. Chromate Conversion Coatings**
Handy reference file on Iridite chromate conversion coatings. Allied Research Products, Inc., 4004-06 E. Monument St., Baltimore 5, Maryland.

**68. Conveyor Chain**
Bulletin illustrates and describes A-F engineered conveyor chain. Contains dimensional prints of various sizes of chain, installation photos, other data on attachments and accessories. Alvey-Ferguson Co., 636 Disney St., Cincinnati 9, Ohio.

**69. Catalytic Coatings**
An eight-page brochure describes IFCO Catalytic Coatings. Industrial Finishes Co., Inc., 1119 Land Title Bldg., Philadelphia 10, Pa.

**70. Anodes for Acid Copper Plating**
Reprint of an article about copper plating anodes describes the benefits that accrue to the user of alloy anodes containing a small amount of phosphorous. American Brass Co., Waterbury 20, Conn.

**71. Phosphate Coating for Steel**
Four-page brochure describes various phosphate coatings on steel, which bond the paint and protect the metal from underfilm corrosion. Includes handy selection chart. Amchem Products, Inc., Ambler, Pa.

**72. Felt Polishing Products**
Twelve-page booklet describes felt wheels, tells about typical applications; has table to aid in selection of felt wheels; table of specifications; directions for setting up and caring for felt wheels; maintenance "do's" and "don'ts"; descriptions of felt bobs; other useful data. Bacon Felt Co., 447 W. Water St., Taunton, Mass.

**73. Centrifugal Machinery**
A 16-page product brochure describes the entire line of Barrett centrifugal machinery, including oil extractors, washers, dryers, galvanizers, enamelers and other equipment. Contains information on design features, application data, performance data, special applications and so on. Leon J. Barrett Co., 1449 Grafton Rd., Worcester 1, Mass.

**74. Modular Electrostatic Spray**
Bulletin E-1 describes modular electrostatic spray systems, self-contained "packages" that include all the equipment and accessories necessary to apply paint electrostatically. Binks Manufacturing Co., 3118-40 Carroll Ave., Chicago 12, Illinois.

**75. Tack Cloth Data**
Data sheet describes cloth, chemicals, packaging and general qualities that tack cloth should have to be most efficient. Bond Chemical Products Co., 2639 Clybourn Ave., Chicago 14, Ill.

**76. Self-Bonding Name Plates**
Bulletin No. 161 describes Poly-Plates, self-bonding metalized polyester film nameplates that can be applied as identification on a variety of products. W. H. Brady Co., 746 W. Glendale Ave., Milwaukee 9, Wisconsin.

**77. Finishing Systems**
Eight-page bulletin describes typical finishing systems for applying organic coatings; ovens; spray booths, flow coaters, washers, air make-up units, control panels and blowers; radiant-heat combustion systems. Includes photos of typical units. Burdett Manufacturing Co., 4916 S. Monitor Ave., Chicago 38, Ill.

**78. Belt Conveyors**
Four-page bulletin contains complete details on Series L-M horizontal and inclined belt conveyors. Catalog 80 describes stock components, includes complete detailed diagrams of typical cross sections, installation views. E. W. Buschman Co., 4516 Clifton Ave., Cincinnati 32, Ohio.

**79. Contact Wheel**
Folder tells about the advantages of R54 Universal Cosmowheel. Includes table to show recommendations for correct use of these wheels. Chicago Rubber Co., Inc., 651 S. Market St., Waukegan, Ill.

**80. Electrostatic Spray Painting**
Information on the Ransburg No. 2 electrostatic spray painting process. Ransburg Electro-Coating Corp., 3939 W. 56th St., Indianapolis 23, Ind.

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**81. Spray Nozzles**
Catalog No. 33 is designed to help the user select the proper type of spray nozzle for a particular application. Complete data on each type of nozzle, including photo, construction details, capacity, recommended uses, spray characteristics, materials available. Delavan Mfg. Co., Grand Ave. and Fourth St., West Des Moines, Iowa.

**82. Anodizing Cylinder**
Data sheet describes and illustrates all-titanium adjustable anodizing cylinder, for use in bulk processing of bolts, screws, rivets and so on. Detroit Industrial Process Co., 9301 French Rd., Detroit 13, Mich.

**83. Spray Gun Catalog**
New catalog (Form I-2000) covers manual and automatic spray guns for general and special service. Tells the user how to select the proper gun for the job to be done and the material to be used. Includes valuable information on cleaning and lubricating spray guns. Dept. 133, The DeVilbiss Co., Toledo 1, Ohio.

**84. Methylene Chloride**
Information on methylene chloride, for use in paint and varnish removers and for cold cleaning. Dow Chemical Co., Midland, Mich.

**85. Carbonate Removal**
Bulletin tells how to remove carbonates from cyanide plating solutions. Electrochemicals Dept., E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del.

**86. Agitating Equipment**
Sixteen-page catalog introduces many new items which have been added to an extensive line of laboratory and production agitators. Eclipse Air Brush Co., 381 Park Ave., Newark 7, N. J.

**87. Oven Sections**
Form No. 55-105 is a four-page folder on Radiant Rod oven sections for drying, baking, pre-heating and other industrial heating applications. These units can be assembled and interlocked on the job to form an oven quickly. Fostoria Pressed Steel Corp., Fostoria, Ohio.

**88. Washing Machine Cleaners**
A comprehensive line of cleaners designed for use in power spray washing machines is fully described in Technical Data Sheet No. 7, a five-page usage and instruction sheet. Free-rinsing, nonfoaming and of maximum detergency, this group of cleaners covers a wide range of variables, such as basis metal, type of soil, water, time, temperature, pressure and volume of solution. MacDermid, Inc., Waterbury 20, Conn.

**89. Coated Abrasives**
Information on the company's line of coated abrasive products: belts, rolls, sheets, discs, specialties. Abrasive Products, Inc., South Braintree 85, Mass.

**90. Compounds for Barrel Processing**
"Permag Compounds for Barrel Processing" is the title of a manual that gives basic information on barrel processing compounds, specific data on deburring and roughing, coloring and burnishing, descaling, rust prevention, neutralizing, other topics. Includes methods for calculating volumes of barrels, notes from case histories. Magnuson Products Corp., 50 Court St., Brooklyn 1, N. Y.

**91. Mechanical Finishing Machine**
Bulletin 71-10-5M describes the Mechamatic Process . . . what it is and what it does; shows typical machines; lists production advantages. The Mechamatic process employs a high-speed directional flow of abrasive in a fluid mass. Parts to be processed are held on a fixture or spindle, which rotates in a direction with or opposite to the flow of the fluid mass. Mecha-Finish Corp., Sturgis, Mich.

**92. Plastisol Compounds**
Bulletin VP-2 describes series 4000 and 5300 plastisol compounds—vinyl materials available in various types for a wide variety of applications and functions, from anti-corrosive protective coatings to abrasion-resistant decorative finishes. Tells how to apply, discusses properties obtained, advantages of use. Metal & Thermit Corp., Rahway, N. J.

**93. Paint Mixer**
Data sheet on Miracle paint rejuvenators, which mix paint without removing the lid from the container, by shaking the can vigorously. Miracle Paint Rejuvenator Co., 500 N. Robert St., St. Paul 1, Minn.

**94. Barrel Finishing Abrasives**
An 85-page manual on barrel processing contains valuable data on the barrel finishing process, typical parts and materials, types of abrasives, equipment, compounds, rust preventives, and a glossary of terms. Norton Co., Worcester 6, Mass.

**95. Heavy Phosphate Coating**
Folder describes Oakite Cryscoat HC, which produces a heavy (150 to 1200 milligrams per square foot) phosphate coating. Oakite Products, Inc., 20 Rector St., New York 6, N. Y.

**96. Cold Solvent Stripper**
Data sheet on Octastrip 444, a nonflammable cold solvent stripper that quickly removes organic finishes from all metals. Octagon Process, Inc., 15 Bank St., Staten Island 1, N. Y.

**97. Metal Preparation Products**
Literature describes products for cleaning, rust removal, phosphatizing, conversion coating and cold forming. Neilson Chemical Co., 2302 Gainsboro, Detroit 20, Ferndale, Mich.

**98. Lab Ovens**
Data sheet describes new features of recently introduced constant-temperature laboratory ovens, Model No. LO-200C. Grieve-Hendry Co., Inc., 1414 W. Carroll Ave., Chicago 7, Ill.

**99. Belt Grinder**
Bulletin 336-T describes new universal belt grinder with U-2 head for contact-wheel, flexible-belt, platen and contour-wheel grinding and the U-1 head for internal and flexible-belt grinding. Hammond Machinery Builders, Inc., 1622 Douglas Ave., Kalamazoo, Mich.

**100. Filtration Equipment.**
Eight-page booklet describes Fulflo and CFC filters for liquids and gases. Includes models for removing dirt and moisture from from compressed air, and processing corrosive solutions. Commercial Filters Corporation, Melrose, Mass.

**101. Bright Copper**
Data sheet describes Cynorex high-speed copper cyanide plating process and Cuprex acid copper plating process, tells about advantages of each. Harshaw Chemical Co., 1945 E. 97th St., Cleveland 6, Ohio.

**102. Fast-Sanding Filler**
Information on Lowe Vinoc, a filler said to reduce sanding time. Lowe Brothers Co., Dayton 2, Ohio.

**103. Filter Pumps**
Folder describes Sethco filter pump units, includes data on various models, types of filter tubes, rate of filtration, back washing, operational advantages. Sethco Mfg. Co., 2292 Babylon Turnpike, Merrick, Long Island, N. Y.

**104. Laboratory Services**
Folder entitled "When, Why, How to Use an Independent Laboratory." South Florida Test Service, 4301 N. W. Seventh St., Miami 44, Florida.

**105. Aerosol Finishes**
Booklet entitled "Aerosols Unlimited" describes aerosol-packaged paints. Spray-on Products, Inc., 2077 E. 65th St., Cleveland 3, Ohio.

**106. Wrinkle Plastisol**
Bulletin gives complete data on Stanley Wrinkle Plastisols: how to apply, abrasion resistance, chemical resistance, other data. Stanley Chemical Co., 1338 Berlin St., East Berlin, Conn.

**107. Zinc Plating Solution Purifier**
Folder on Zinc-Brite, a cleansing and purifying agent for cyanide zinc plating solutions. Sulphur Products Co., Inc., 621 W. Pittsburgh St., Greenburg, Pa.

**108. Nickel Stripper**
Complete technical data on Ni-Plex, a chemical stripper for removing nickel from die castings and other base metals. Technic, Inc., Providence, R. I.

**109. Abrasive Belt Finisher**
Literature sheet on the Timesaver Speed-belt 12 abrasive belt machine. Includes photograph, specifications. Timesaver Sanders, P. O. Box 7446, Robbinsdale Sta., Minneapolis 22, Minn.

**110. Safety Solvent**
Four-page folder describes Turco-Solv, a detergent-action safety solvent which evaporates to complete dryness without leaving a residue. Requires no rinsing, is safe on all metals. Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1, Calif.

**111. Bright Cadmium**
Technical Bulletin No. CDP-53 describes Bry-Cad, includes data on solution composition, brighteners, temperature, agitation, equipment, surface treatment and bright dipping, additions, and so on. Udylite Corp., Detroit 11, Mich.

**112. Alkaline Derusting, Descaling**
Bulletin PR-AD-1 describes the use of periodic reverse in alkaline derusting and descaling. Unit Process Assemblies, Inc., 61 E. Fourth St., New York 3, N. Y.

**113. Acid-Resistant Clothing**
Detailed data on a complete line of acid and chemical resistant industrial apparel is contained in the 1958 Worklon Catalog. Worklon, Inc., 253 W. 28th St., New York 1, N. Y.

**114. Cleaning and Finishing Products for Aircraft Industry**
Booklet F2178 describes complete line of products for aircraft cleaning and maintenance: products for aluminum, magnesium and steel cleaning; spray booth maintenance; aluminum brightening; removing carbon; removing paint; and others. J. B. Ford Div., Wyandotte Chemicals Corp., Wyandotte, Mich.

**115. Drying and Baking Booklet**
Data Booklet D117 shows how heating units and ovens of all sizes and shapes can be built at low cost from prefabricated interlocking infrared sections. Dry Clime Lamp Corp., Greensburg, Indiana.

**116. Roller Coating Equipment**
Information on Gasway Rollacoating Equipment. Gasway Corporation, 6463 N. Ravenswood Ave., Chicago 26, Ill.

**117. Prevent Wear on Buffing Fixtures**
General information folder tells about Fusecoating buffing fixtures to prevent wear by abrasion. Fusion Metal Coating Co., 25493 W. Eight Mile Rd., Detroit 19, Mich.

**118. Cleaning Compound**
Information on Apex 764, a moderately alkaline composition containing deflocculators and emulsifiers for removing insoluble soils from ferrous metals. Apex Alkali Products Co., Main & Rector Sts., Philadelphia 27, Pa.

**119. Black Finishes**
Information on Ebonol products for blackening steel, copper, brass, zinc. Enthone, Inc., 442 Elm St., New Haven 11, Conn.

**120. Liquid Buffing Compound**
Data sheet points out the advantages of using Liquispray in cost savings and increased efficiency and quality. The Stutz Co., 4410 Carroll Ave., Chicago 24, Ill.

**121. Durable Finish**
Information on Kadmoid, a tough, durable finish said to offer peak resistance to salt and other chemicals on products that must resist outdoor exposure. Universal Paint & Varnish, Inc., Box 199, Bedford, Ohio.

**122. Vacuum Plating**
Information on depositing metallic coatings by the vacuum plating method. Consolidated Electrodynamics, Rochester Div., Rochester 3, N. Y.

**123. Rhodium Plating Instructions**
Booklet entitled "General Instructions for Use of Rhodium Plating Solutions" tells how to prepare the solution, what temperatures and current to use, gives information on tanks, anodes, maintenance of the bath. Sigmund Cohn Mfg. Co., Inc., 121 S. Columbus Ave., Mount Vernon, N. Y.

**124. Phosphate Coating for Aluminum**
Folder describes Bonderite 700 Series for aluminum. Available in two colors—gold and green, both of which increase corrosion resistance. Parker Rust Proof Co., 2172 E. Milwaukee Ave., Detroit 11.

**125. Zinc Bright Dip**
Bulletin 4-4 describes Promat D-32-A chrome-protective-type bright dip, an acid dip that produces a bright finish on zinc. This finish has excellent corrosion resistance and paint base characteristics. Promat Div., Poor and Co., 851 S. Market St., Waukegan, Ill.

**126. Two-Three Stage Degreasers**
Bulletin No. 655 describes two- and three-stage solvent degreasers, how they work, advantageous design features. Ramco Equipment Corp., 811 Edgewater Rd., New York 59, N. Y.

**127. Vertical Washer**
Information on Ransohoff vertical conveyor-type washer, which occupies space only four by four feet, yet has conveyor eleven feet tall, does the job of washer that normally would require 44 square feet of floor space. Ransohoff, Inc., 610 N. Fifth St., Hamilton, Ohio.

**128. Paint Arrestors**
Information on RP paint arrestors, dry-type filters for removing paint solids from spray booth exhaust air. Research Products Corp., 1015 E. Washington Ave., Madison 10, Wisconsin.

**129. Rhodium Plate**
A 24-page booklet tells where, when and how to use rhodium electroplates for electrical, electronic and other exacting industrial applications. Booklet gives detailed analysis of advantages of rhodium plate in specific applications. Includes graphs and charts that show rates of deposition under various conditions; bath preparation and control; current densities; and so on. Sel-Rex Corporation, Nutley 10, N. J.

**130. Copper Cyanide**
Ledoux's Laboratory Report shows that CP's copper cyanide has high purity necessary to produce good plating results. Copies available. Copper Pigment & Chemical Works, Elizabeth 2, N. J.

**131. Aluminum-Processing Chemicals**
Technical data sheets describe aluminum-processing chemicals: cleaners, desmutting chemicals, etchants. Cowles Chemical Co., 7016 Euclid Ave., Cleveland 3, Ohio.

**132. Bronze Powders**
Color card shows 33 colors of bronze-like finishes that can be produced from stock Cres-Lite bronze powders. Crescent Bronze Powder Co., 118 W. Illinois St., Chicago 10, Ill.

**133. Temperature Controls**
Sarco Case History No. 174 contains complete details on LSI temperature controls. Sarco Co., Inc., 635 Madison Ave,. New York 22, N. Y.

**134. Baking and Drying**
Bulletin on Chromalox Modular Panels, which can be used as "building blocks" to construct ovens and drying panels. Edwin L. Wiegand Co., 7522 Thomas Blvd., Pittsburgh 8, Pa.

**135. Vacuum Metalizing Filaments**
Information on high-density tungsten strands, designed to be used in vacuum metalizing. Sylvania Electric Products, Inc., Tungsten and Chemical Div., Towanda, Pa.

**136. Chromic Acid**
Information on BFC chromic acid. Better Finishes & Coatings, Inc., 268 Doremus Ave., Newark 5, N. J.

**137. Plating Waste Recovery**
Literature describes systems for recovering valuable materials from plating wastes. These systems will return fresh plating solutions to the plating tanks and at the same time return pure water to rinse tanks. Industrial Filter & Pump Mfg. Co., 5904 Ogden Ave., Chicago 50, Illinois.

**138. Tumbling Barrels**
Catalog describes and illustrates a complete line of tumbling barrels. Henderson Brothers Company, 138 S. Leonard St., Waterbury, Conn.

**139. Buffs**
Data on buffs with patented centerless construction. American Buff Co., 2414 S. LaSalle St., Chicago 16, Ill.

**140. Degreasing Solvents**
Information on Nialk trichlorethylene degreasing solvent. Hooker Chemical Co., 1406 Union St., Niagara Falls, N. Y.

**141. Reduce Painting Costs**
Brochure contains information about Duracron Thermo-Setting Acrylic Enamel and how it reduces manufacturing costs. Pittsburgh Plate Glass Co., Industrial Finishes Div., 1 Gateway Center, Pittsburgh, Pa.

**142. Rinse Aid**
Information on Rins-Aid, an additive for rinse water. It prevents staining and tarnishing and hastens drying. R. O. Hull & Co., Inc., 1304 Parsons Ct., Rocky River 16, Ohio.

**143. Brass Additive**
Information on an additive formulated to increase efficiency and throwing power of brass plating solutions. Jelco Finishing Equipment Corp., 153 E. 26th St., New York 10, N. Y.

**144. Ovens for Industry**
"Ovens for Industry" catalog describes and illustrates many different types and sizes of industrial ovens. Kirk & Blum Mfg. Co., 3116 Forrer St., Cincinnati 9.

**145. Blasting Abrasives**
Data on Exolon Fastblast abrasives. The Exolon Co., 943 E. Niagara St., Tonawanda, N. Y.

**146. Quick-Dry Paint Dip**
Data on the Harding Hot-Dip Process, in which the article to be painted is preheated, dipped into paint that has been heated to 160 deg. F. Paint is formulated with chlorinated solvents, which flash off rapidly as soon as the heated article leaves the dip tank. David-Ludwig Co., 14290 Goddard, Detroit 12, Mich.

**147. Isophthalic-Based Paints**
Information on the improved abrasion resistance, weather resistance, film flexibility and gloss retention of paints made with isophthalic-based resins. Oronite Chemical Co., 200 Bush St., San Francisco, Calif.

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| 3 | 19 | 35 | 51 | 67 | 83 | 99 | 115 | 131 | 147 | 303-4th Cov. | 332 | 348 | 364 | 380 | 396 | 412 | 428 | 444 |
| 4 | 20 | 36 | 52 | 68 | 84 | 100 | 116 | 132 | 148 | 304 | 317 | 333 | 349 | 365 | 381 | 397 | 413 | 429 | 445 |
| 5 | 21 | 37 | 53 | 69 | 85 | 101 | 117 | 133 | 149 | 305 | 318 | 334 | 350 | 366 | 382 | 398 | 414 | 430 | 446 |
| 6 | 22 | 38 | 54 | 70 | 86 | 102 | 118 | 134 | 150 | 306 | 319 | 335 | 351 | 367 | 383 | 399 | 415 | 431 | 447 |
| 7 | 23 | 39 | 55 | 71 | 87 | 103 | 119 | 135 | 151 | 307 | 320 | 336 | 352 | 368 | 384 | 400 | 416 | 432 | 448 |
| 8 | 24 | 40 | 56 | 72 | 88 | 104 | 120 | 136 | 152 | 308 | 321 | 337 | 353 | 369 | 385 | 401 | 417 | 433 | 449 |
| 9 | 25 | 41 | 57 | 73 | 89 | 105 | 121 | 137 | 153 | 309 | 322 | 338 | 354 | 370 | 386 | 402 | 418 | 434 | 450 |
| 10 | 26 | 42 | 58 | 74 | 90 | 106 | 122 | 138 | 154 | 310 | 323 | 339 | 355 | 371 | 387 | 403 | 419 | 435 | 451 |
| 11 | 27 | 43 | 59 | 75 | 91 | 107 | 123 | 139 | 155 | 311 | 324 | 340 | 356 | 372 | 388 | 404 | 420 | 436 | 452 |
| 12 | 28 | 44 | 60 | 76 | 92 | 108 | 124 | 140 | 156 | 312 | 325 | 341 | 357 | 373 | 389 | 405 | 421 | 437 | 453 |
| 13 | 29 | 45 | 61 | 77 | 93 | 109 | 125 | 141 | 157 | 313 | 326 | 342 | 358 | 374 | 390 | 406 | 422 | 438 | 454 |
| 14 | 30 | 46 | 62 | 78 | 94 | 110 | 126 | 142 | 158 | 314 | 327 | 343 | 359 | 375 | 391 | 407 | 423 | 439 | 455 |
| 15 | 31 | 47 | 63 | 79 | 95 | 111 | 127 | 143 | 159 | 315 | 328 | 344 | 360 | 376 | 392 | 408 | 424 | 440 | 456 |
| 16 | 32 | 48 | 64 | 80 | 96 | 112 | 128 | 144 | 160 | 316 | 329 | 345 | 361 | 377 | 393 | 409 | 425 | 441 | 457 |

SEPTEMBER, 1958

NAME _____ POSITION _____

COMPANY _____

STREET _____

CITY _____ ZONE _____ STATE _____

PRODUCTS MANUFACTURED _____

**Circle numbers (NOT PAGE NUMBERS) to request information**


| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 17 | 33 | 49 | 65 | 81 | 97 | 113 | 129 | 145 | 301-2nd Cov. | 330 | 346 | 362 | 378 | 394 | 410 | 426 | 442 |
| 2 | 18 | 34 | 50 | 66 | 82 | 98 | 114 | 130 | 146 | 302-3rd Cov. | 331 | 347 | 363 | 379 | 395 | 411 | 427 | 443 |
| 3 | 19 | 35 | 51 | 67 | 83 | 99 | 115 | 131 | 147 | 303-4th Cov. | 332 | 348 | 364 | 380 | 396 | 412 | 428 | 444 |
| 4 | 20 | 36 | 52 | 68 | 84 | 100 | 116 | 132 | 148 | 304 | 317 | 333 | 349 | 365 | 381 | 397 | 413 | 429 | 445 |
| 5 | 21 | 37 | 53 | 69 | 85 | 101 | 117 | 133 | 149 | 305 | 318 | 334 | 350 | 366 | 382 | 398 | 414 | 430 | 446 |
| 6 | 22 | 38 | 54 | 70 | 86 | 102 | 118 | 134 | 150 | 306 | 319 | 335 | 351 | 367 | 383 | 399 | 415 | 431 | 447 |
| 7 | 23 | 39 | 55 | 71 | 87 | 103 | 119 | 135 | 151 | 307 | 320 | 336 | 352 | 368 | 384 | 400 | 416 | 432 | 448 |
| 8 | 24 | 40 | 56 | 72 | 88 | 104 | 120 | 136 | 152 | 308 | 321 | 337 | 353 | 369 | 385 | 401 | 417 | 433 | 449 |
| 9 | 25 | 41 | 57 | 73 | 89 | 105 | 121 | 137 | 153 | 309 | 322 | 338 | 354 | 370 | 386 | 402 | 418 | 434 | 450 |
| 10 | 26 | 42 | 58 | 74 | 90 | 106 | 122 | 138 | 154 | 310 | 323 | 339 | 355 | 371 | 387 | 403 | 419 | 435 | 451 |
| 11 | 27 | 43 | 59 | 75 | 91 | 107 | 123 | 139 | 155 | 311 | 324 | 340 | 356 | 372 | 388 | 404 | 420 | 436 | 452 |
| 12 | 28 | 44 | 60 | 76 | 92 | 108 | 124 | 140 | 156 | 312 | 325 | 341 | 357 | 373 | 389 | 405 | 421 | 437 | 453 |
| 13 | 29 | 45 | 61 | 77 | 93 | 109 | 125 | 141 | 157 | 313 | 326 | 342 | 358 | 374 | 390 | 406 | 422 | 438 | 454 |
| 14 | 30 | 46 | 62 | 78 | 94 | 110 | 126 | 142 | 158 | 314 | 327 | 343 | 359 | 375 | 391 | 407 | 423 | 439 | 455 |
| 15 | 31 | 47 | 63 | 79 | 95 | 111 | 127 | 143 | 159 | 315 | 328 | 344 | 360 | 376 | 392 | 408 | 424 | 440 | 456 |
| 16 | 32 | 48 | 64 | 80 | 96 | 112 | 128 | 144 | 160 | 316 | 329 | 345 | 361 | 377 | 393 | 409 | 425 | 441 | 457 |

SEPTEMBER, 1958

NAME _____ POSITION _____

COMPANY _____

STREET _____

CITY _____ ZONE _____ STATE _____

PRODUCTS MANUFACTURED _____

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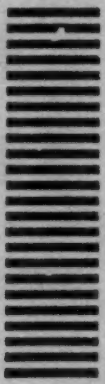

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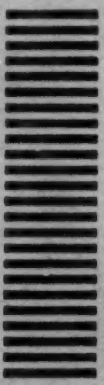

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